Chemical Week

April 14, 1956

Price 35 cents

Will Reichhold and Catalin merge at last? Here's what's ahead if the plan goes through . . . . p. 17

Get more out of meetings by keeping them short: Ansul executives learn how . . . . . p. 28

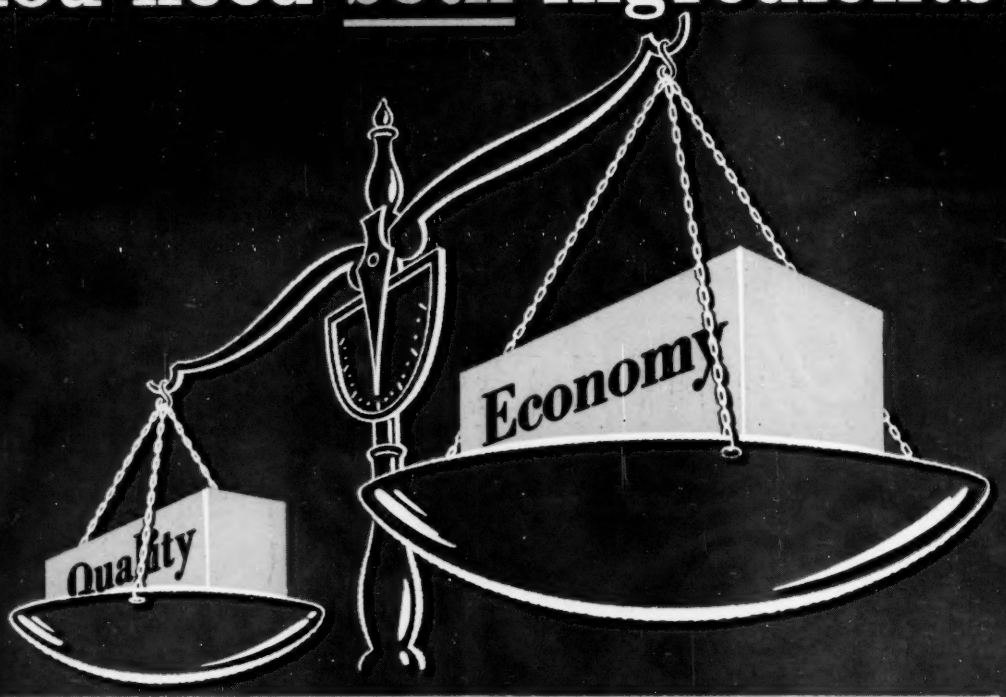
Beauty shop permanents have a $30-million charm for chemical makers . . . . . p. 44

Stauffer's Carlson: He wants traffic men put on top-management teams. . . . . p. 76

Watch for new epoxy chemicals when Carbide's pure peracetic acid process gets rolling. . p. 92

A McGRAW-HILL PUBLICATION

You need both ingredients



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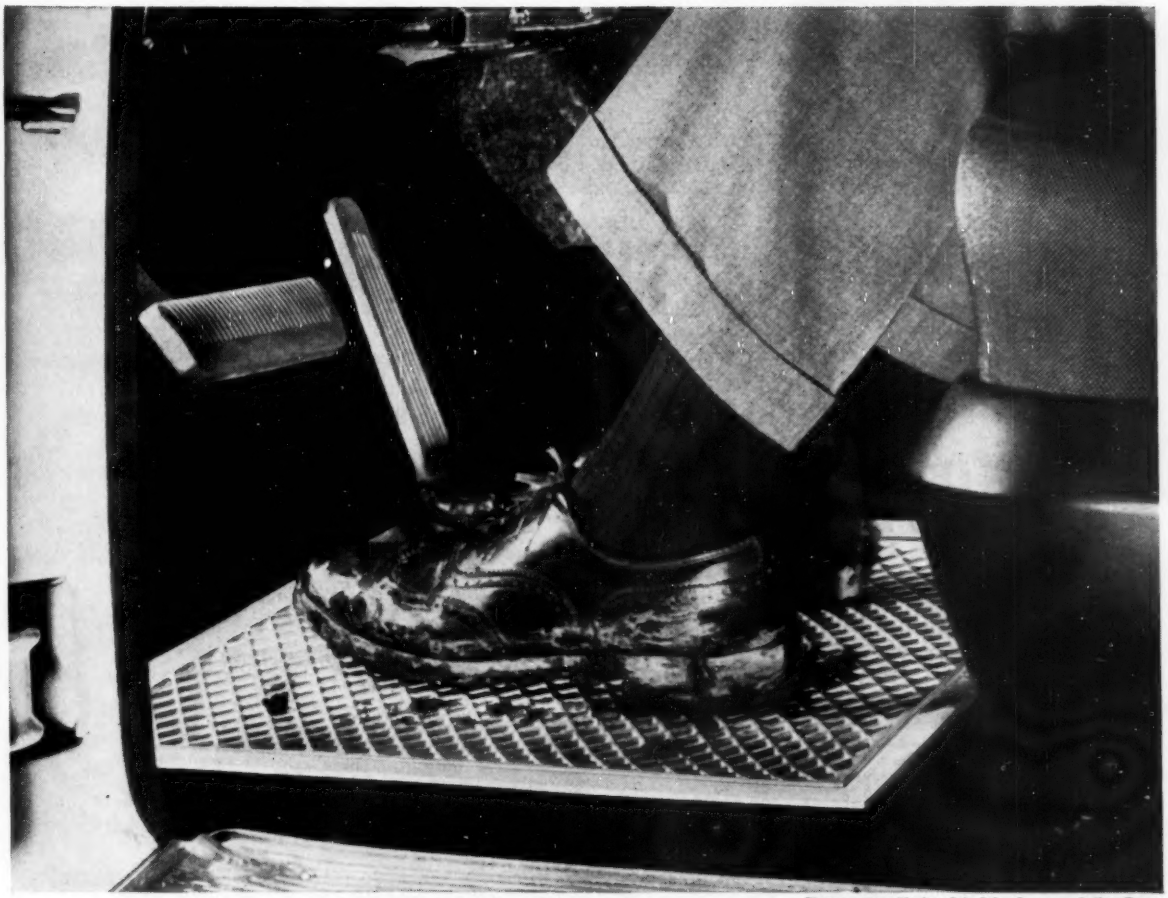
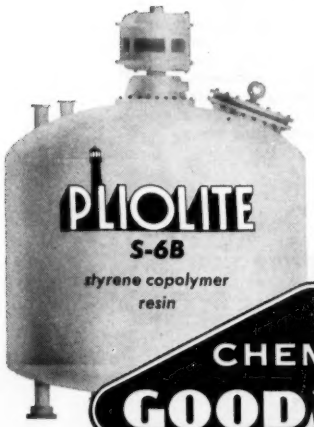


Photo courtesy Monkey Grip Sales Company, Dallas, Texas

A Mat-erial Improvement!



Rubber automotive floor mats as pictured above are now better than ever. The reason? They have been materially improved by the incorporation of PLIOLITE S-6B in the base stock.

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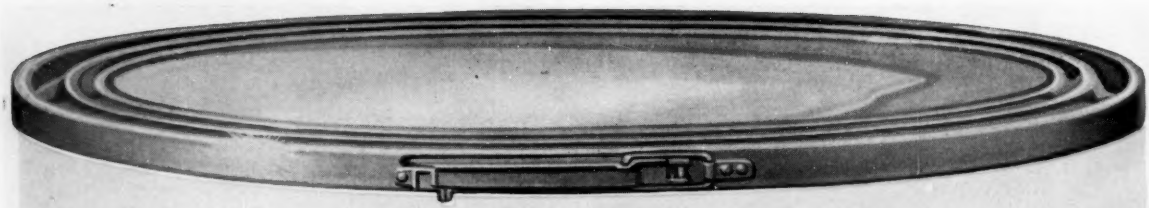

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Chemical Week

TOP OF THE WEEK

April 14, 1956

ODM chief Flemming changes his mind, may grant fast tax write-offs for butadiene-from-butane units after all p. 18

Swamped with unusable research project suggestions? Here's how tactful research directors turn them down p. 59

Alarmed ag chemical makers gird to meet threat posed by rapid growth of co-ops .....p. 82

Total U.S. chromite ore use jumped 70% in '55, consumption of chemical-grade ore climbed 19%; but foreign activities bode new problems for producers of chrome chemicals .....p. 106

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Resins made from FA are chemically resistant to acids and alkalies as well as to solvents. FA also reacts with phenolic compounds, formaldehyde, melamine, and urea to form resins with modified properties.

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BIRD RESEARCH AND DEVELOPMENT CENTER
TEST REPORT No. 4093
Dates: January 4, 5, 6, 1956
Company: Blank Mining Co.
Blankton, Montana
Material: Uranium Ore
Problem: Dewater and wash
2000 tons per day. Three
washes, each ½lb. water
per lb. solids
Sample:
Amt. Three 30-gallon drums
Slurry: Viscosity 100 Sp.
gr. 1.50 pH 2.0 Temp. room
Solids: See attached screen
analysis
Size: MAX 35 mesh
Feed: to contain 45.0% solids
Description of test: The material
as received was diluted by
tap water to a consistency of

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in equipment, Bird can give you the right answer to the question, "which filter will do the best job for me and do it *profitably?*"

This time-saving, money-saving service is the function of the Bird Research and Development Center, a completely equipped test plant with its own full time crew of experts, devoted exclusively to test work and application development involving solids-liquids separations.

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Chemical Week

April 14, 1956 *Vol. 78, No. 15*

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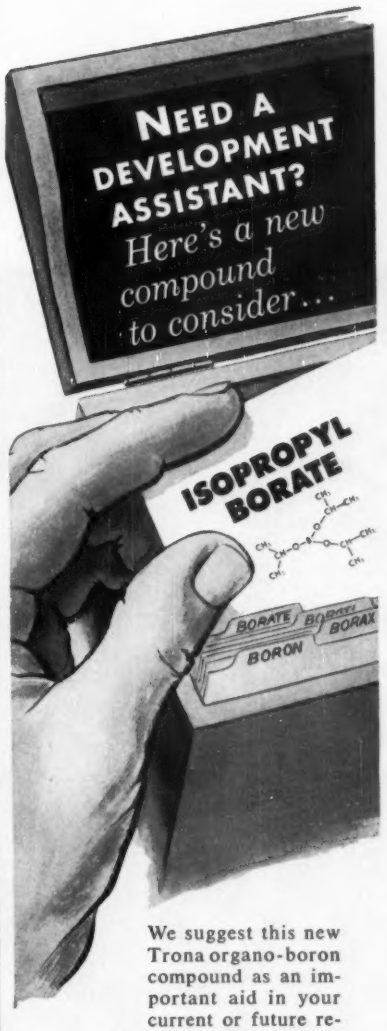

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$(C_3H_7O)_3B + 3ROH \longrightarrow (RO)_3B + 3C_3H_7OH$
$(C_3H_7O)_3B + 3C_6H_5CHO \longrightarrow (C_6H_5CH_2O)_3B + 3(CH_3)_2CO$

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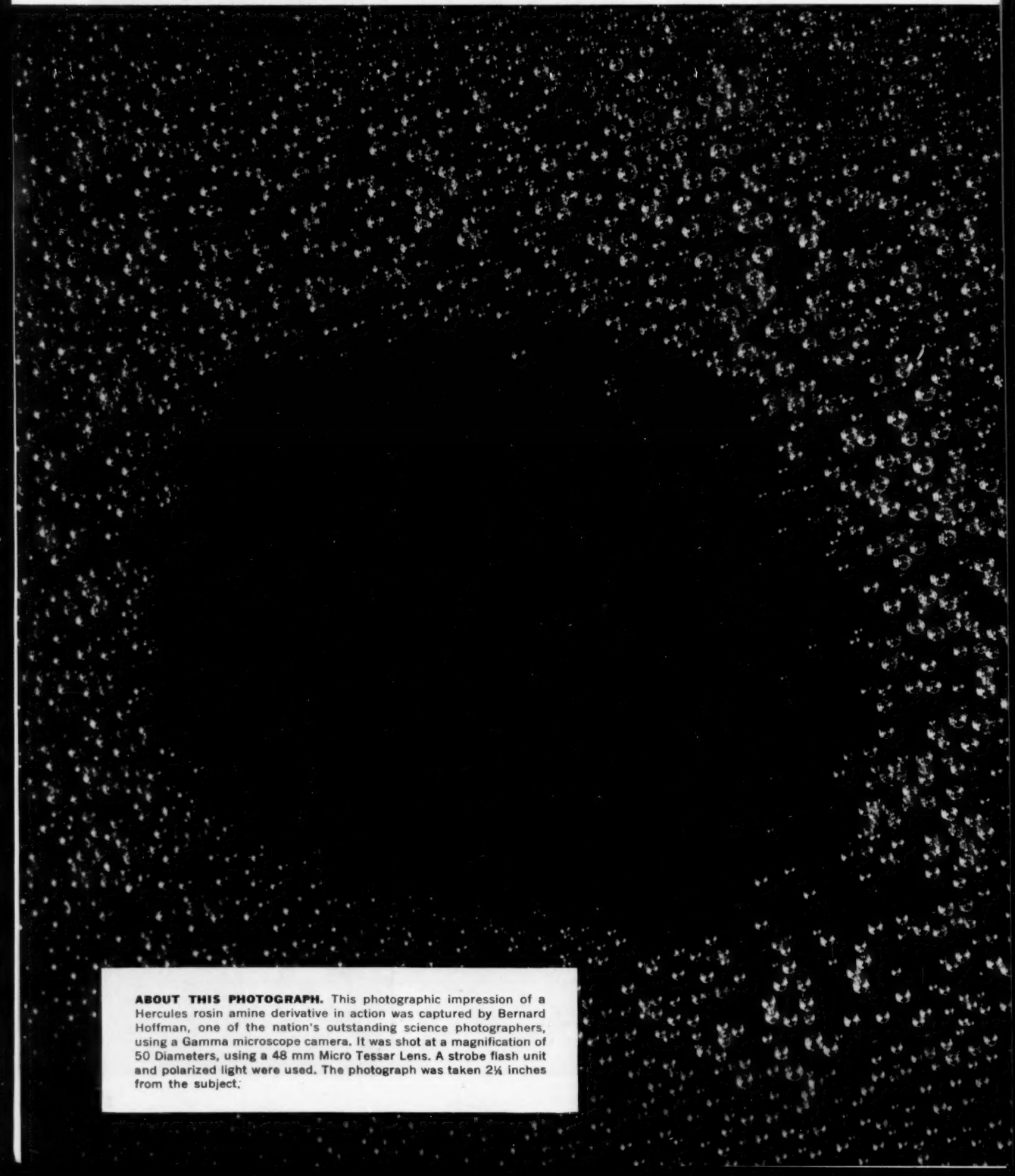
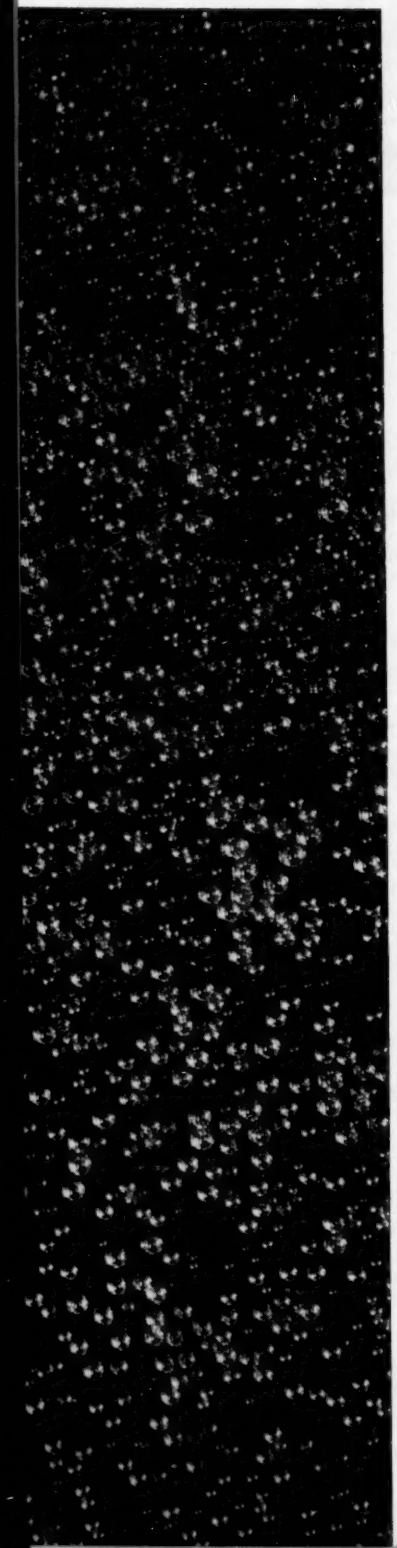
A New Look at Rosin Amine Through the Camera's Eye

(*one of a series*)



ABOUT THIS PHOTOGRAPH. This photographic impression of a Hercules rosin amine derivative in action was captured by Bernard Hoffman, one of the nation's outstanding science photographers, using a Gamma microscope camera. It was shot at a magnification of 50 Diameters, using a 48 mm Micro Tessar Lens. A strobe flash unit and polarized light were used. The photograph was taken 2¼ inches from the subject.

Adsorption to Metallic Surfaces



EXAMPLE: *Corrosion Inhibition*

This is a photograph of a safety island in a corrosive sea. A piece of mild steel has been completely covered with acid. The tiny bubbles being generated are the beginning of corrosive attack. The center area—free of bubbles—has been covered with a film of Rosin Amine D* derivative—proof of the inhibiting properties that have made this derivative an important weapon in the battle against corrosion.

Rosin amine derivatives adsorb to all types of metal surfaces. This results in an adsorbed film of closely-packed molecules that acts as a protective barrier between the metal surface and acidic fluids. Corrosion inhibition is one result of such a film.

The same property, however, is useful in anti-fouling agents for removal of solids such as salts, corrosion products, sludges from the metal surface. Preferential wetting of metal surfaces by either oil or water is another application of this property.

As chemical building blocks, Rosin Amine D and its derivatives offer opportunities to create new products and improve established ones. The wide range of basic properties they provide includes adsorption to siliceous surfaces, surface activity, and control of microbiological organisms. The amine derivatives are available in oil-soluble, water-soluble, and acid-soluble types.

Why not take a look at rosin amine. We'll be glad to send you detailed technical data.

*Hercules trademark

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NA56-2

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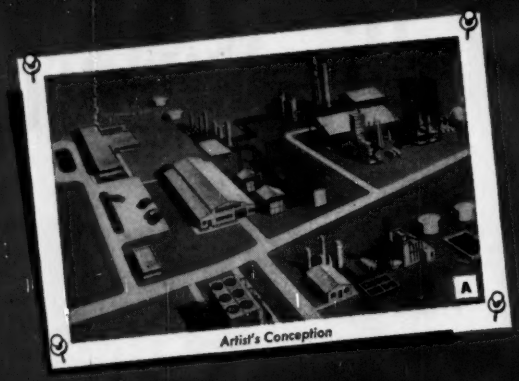
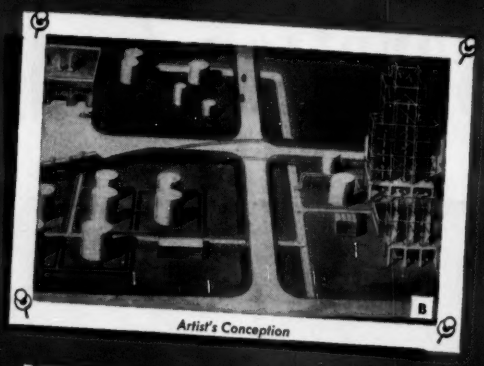




CURRENT CHEMICAL PROJECTS

Shown above are just a few of the current Lummus chemical projects.

A Lummus-designed anhydrous ammonia and ammonium sulfate plants, and a Monsanto-designed sulfuric acid plant under construction for Gonzalez Chemical Industries, Inc., at Guanica, Puerto Rico.

B 30,000,000 lb/yr vinyl acetate plant engineered and constructed by Lummus for Air Reduction Chemical Company to come on stream at Calvert City in early 1956.

C First commercial installation in this country for manufacture of high pressure acetylene derivatives engineered and constructed by Lummus for General Aniline & Film Corporation to begin operations at Calvert City in late 1955.

D Phenol-Acetone plant designed, engineered and constructed for Progil-Electrochimie at Pont de Claix, France in 1955.

Think of Lummus when planning your next plant.

THE LUMMUS COMPANY, 385 Madison Avenue, New York 17, N. Y. *Engineering & Sales Offices:* New York, Houston, Montreal, London, Paris, The Hague, Bombay. *Sales Offices:* Chicago, Caracas. *Heat Exchanger Plant:* Honesdale, Pa. *Fabricated Piping Plant:* East Chicago, Indiana.

LUMMUS

DESIGNING ENGINEERS AND CONSTRUCTORS FOR THE PETROLEUM AND CHEMICAL INDUSTRIES

OTHER CURRENT LUMMUS CHEMICAL PROJECTS

1 60-ton/day anhydrous ammonia plant being engineered and constructed for Westvaco Chlor-Alkali Division, Food Machinery & Chemical Corporation.

2 Carthage Hydrocol, now owned by Stanolind Oil & Gas Co., being redesigned and reconstructed by Lummus for manufacture of synthetic fuel and chemical raw materials from natural gas.

3 Phthalic anhydride plant for Pittsburgh Coke & Chemical Company to be built at Neville Island, Pa.

4 Lummus-designed ammonia plant for St. Paul Ammonia Products, Inc., to be built at Pine Bend, Minnesota.

5 Epon Resin units for Shell Chemical Corporation at Houston, Texas.

6 Bisphenol unit for Shell Chemical Corporation at Houston, Texas.

7 Tetramer, Cumene and Phenol-Acetone units for Societe des Chimiques des Derives du Petrole at Antwerp, Belgium.

8 Sulfuric Acid plant for Inland Chemicals Canada Limited at Fort Saskatchewan, Alberta.

Business
Newsletter

CHEMICAL WEEK
April 14, 1956

Record sales for '56—that's what more and more companies are forecasting in reports to stockholders.

Foote Mineral, for example, puts it this way:

"Our projections indicate that earnings per share for 1956 will be materially higher than in any year to date. Sales for the first two months of 1956 strongly support this belief."

Parke, Davis expects at least a 10% increase in sales and a 10-15% increase in profits. Sales and earnings for the first quarter of '56, President Harry Loynd told stockholders, exceeded earlier company forecasts.

Commercial Solvents, President J. Albert Woods told stockholders at the annual meeting, expects to spend $10 million to expand production of methanol and petrochemical derivatives.

Publicker Industries, which reported a net loss for '55, says that industrial alcohol and chemicals were bright spots on its ledgers. Production and sales of industrial alcohol and chemicals were substantially higher last year than previously; their prices were relatively firmer. The company operates the government's alcohol butadiene plant at Louisville—and it hopes to negotiate either a long-term lease or purchase of the plant.

Abbott Laboratories reports that sales for the first quarter of '56 were higher than for the comparable period in '55—with the trend expected to continue.

President Henry Hillman told Pittsburgh Coke and Chemical stockholders that both sales and earnings for the company this year should top '55's.

With sales for the first quarter up 30%, General Tire says it anticipates profitable results from all divisions for the rest of the year.

Montecatini's annual report, out last week, reports $228 million in sales last year, up 12% from '54. Its profits were up 19%, to $16.3 million.

Montecatini's main U.S. interests, incidentally, continue to lie in licensing its processes. And it admits that U.S. firms have shown a considerable interest in the possible licensing of the Natta isotactic polymers (*CW Technology Newsletter, Feb. 4*).

•

Rohm & Haas is building bomb shelters. A task group working under M. C. Case is constructing a 100 x 200-ft. shelter with a concrete roof deck at its Bristol, Pa., plant. Cost of the one-story structure: approximately $200,000.

A somewhat similar bomb shelter, with an underground cafeteria, has been erected at its Deer Park, Tex., plant.

•

Two miles of river frontage at Joliet, Ill., are waiting for chemical firms. That's the word from Stepan Chemical, which owns half the frontage itself. Some Stepan executives, with a group of investors, own the remainder.

Stepan itself is committing more money that it had previously planned for expansion at the site. It is erecting a 10-million-lbs./year dimethyl sulfoxide unit, instead of a 2-3-million-lb. one originally planned. Completion target date: this month. Also under construction: a 5-million-lbs./year alkyl phenol plant and a 6-7-million-lbs./year ethylene oxide products plant to make ethoxylated alkyl phenols and nitrogen-containing detergent bases. These should be completed by May 15.

A fatty acid amide plant is in the planning stage, as is one for production of ethanolamines.

Other expansions—

Pennsalt will triple its chlorine-caustic unit at Calvert City, Ky., boosting chlorine production from 50 to 150 tons/day. Production of caustic potash and rayon-grade caustic soda will get comparable boosts. Preliminary engineering work for the plant, which will use deNora mercury cells, has been completed; target date for operation: 1957.

Spencer Chemical will diversify its nitrogen chemical production unit at Henderson, Ky. While no increase is planned in the basic ammonia facility, a unit to produce nitric acid in concentrations up to 68% and one for production of aqua ammonia are to be added. The aqua unit, now under construction, will be complete by May 1; the nitric facility is still on the planning boards, but construction is scheduled to begin in October.

A $4-million plant to recover sulfur dioxide from copper smelting wastes produced at its Ruston, Wash., smelter is being designed by American Smelting & Refining Co. engineers, subject to final approval from top company officials. Most of the output—which would be worth some $200,000/month—could be used by pulp mills in the area.

Work has begun at Pincher Creek, Alberta, on a 225-long-tons/day sulfur plant to process gas from the Pincher Creek gas field. Owner of the plant: Canadian Gulf Oil Co. The plant will be designed for easy expansion to an 800-ton plant—if and when Trans Canada Pipe Line Co. gets its line built.

Alcoa will erect a large alumina plant at Point Comfort, Tex. Estimated capacity of over 500,000 tons/year is scheduled for early 1958, will be doubled by 1965 to satisfy expected increased requirements by Alcoa's Point Comfort and Rockdale, Tex., smelters.

Elsewhere on the aluminum scene, Reynolds Metals is considering expansion of its refining facilities, either in northern New York or in the Baie Comeau area, 200 miles east of Quebec.

And Kaiser, which has a $170-million expansion program currently on the books, will sell $120 million worth of 25-year first-mortgage bonds to insurance companies, and $30 million in convertible preferred stock. This stock would be subordinate to the company's present preferred stock.

•

In brief—

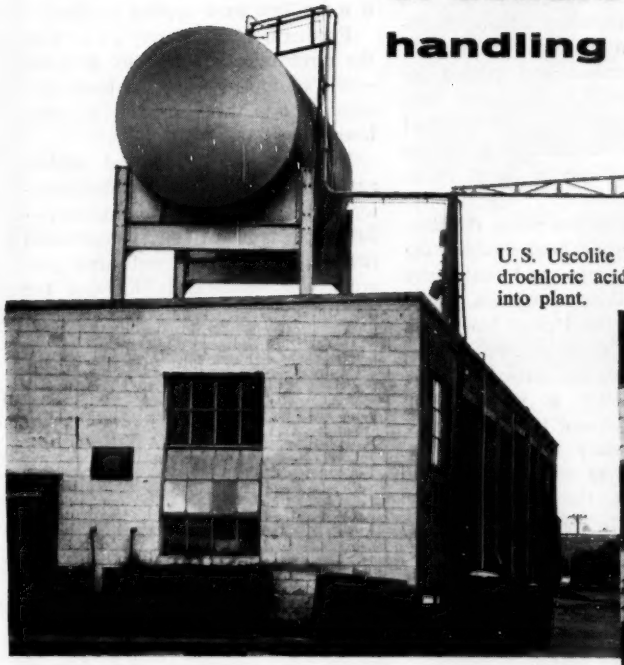
United Carbon will sell its printing ink business—a line foreign to its main interests—to Interchemical Corp.

Pennsalt's former president, George Beitzel, will become a government consultant. He'll assist the Office of Defense Mobilization in a study of whether imports of Swiss watches has hurt the domestic industry.

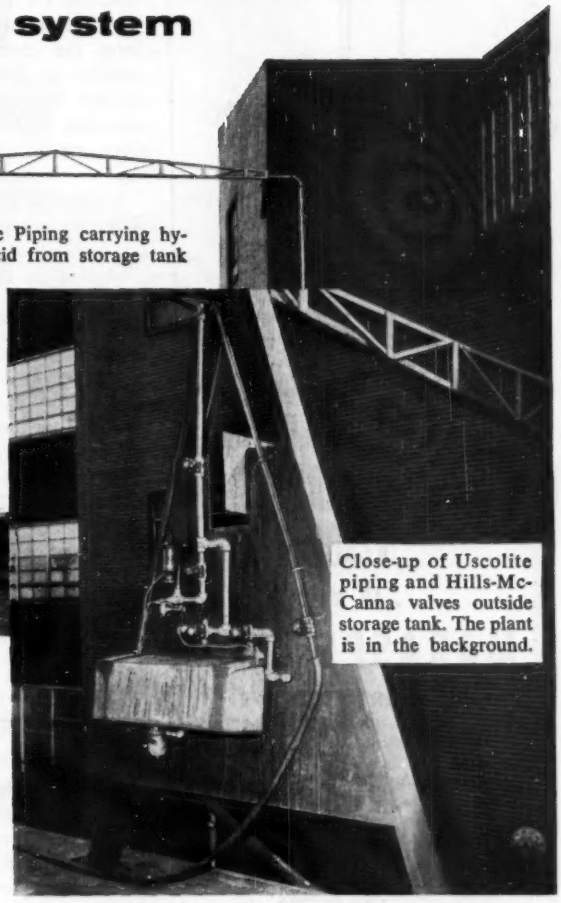
Texas City Chemicals was sued in state court last week for $7,310 worth of unpaid gas bills.

Use of formaldehyde-containing resins to give facial tissues wet strength has been criticized in a report in the April 7 issue of *Journal of the American Medical Assn.* Such tissues, say two New York doctors, can cause contact dermatitis.

Uscolite Pipe helps save thousands of dollars a year in an acid-handling system



U.S. Uscolite Piping carrying hydrochloric acid from storage tank into plant.



Close-up of Uscolite piping and Hills-McCanna valves outside storage tank. The plant is in the background.

A large Eastern manufacturer of lighting and signaling systems uses 300 feet of Uscolite® plastic pipe to carry hydrochloric acid from storage tanks outside the plant across an areaway, and then through various production departments to final use in the plating room. Previously, carboys of acid had been used, because the plant had no facilities to store acid in bulk. But by installing a new acid-handling system, using U.S. Uscolite piping and fittings, the plant saves thousands of dollars a year—they now *buy and store in bulk*. Additional thousands are saved by reduced handling costs.

Uscolite pipe and fittings are made in the broadest and largest line of stock sizes on the market.

The plant engineer is pleased because Uscolite's unusual mechanical strength enables it to be left exposed in any weather, and to be run overhead through various parts of the plant without fear of damage to men or machines. Hills-McCanna Uscolite valves are used in the piping assembly.

Made by United States Rubber Company, Uscolite is light in weight with high impact strength. It is solving acid and corrosion problems in every industry. The piping can be easily threaded and installed with conventional tools. For replacements or a completely new piping system, get in touch with any of our 28 strategically located District Sales Offices, or contact us at Rockefeller Center, New York 20, N. Y.

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OPINION . . . . .

Challenge to Industry

DEAR MR. JOHNSON: It seems to me that the Soviet Union's planned program for chemical expansion focuses attention on the problem that faces the chemical and related industries in the United States with respect to the shortage in qualified technical and engineering graduates from our institutions of higher learning.

Within the past five years, the Russians, we are told, have doubled the number of college and university graduates in these categories, while the number in the United States has declined in the order of 50%. These facts emphasize the importance to American industry as a whole of giving encouragement to the students of our preparatory schools to elect a scientific course and, at the same time, to assist the institutions of higher learning in their efforts to do a better job of instruction by financial support of faculty programs.

K. C. TOWE
President
American Cyanamid Co.
New York

Two Looks at Lime

DEAR MR. KIRKPATRICK: I am writing in connection with the article on lime . . . (*March 17*).

First, the term lime, insofar as agricultural use is concerned, no longer means to the average person what is technically correct by this term. Hydrated and burned lime have been almost entirely replaced in the nation by agricultural limestone as a soil additive. Consequently, when many people saw the chart on page 132, which indicated that the agricultural "lime" use was 260,000 tons, they were amazed in view of our current national usage of approximately 19 million tons of agricultural liming material. (I believe the 260,000 tons is substantially lower than the final figures determined by the Bureau of Mines.) . . . . The article states . . . "Further additions of lime—unlike fertilizers—will not produce better crop yields." . . . Agronomists of this nation have indicated we should be using 80 million tons per year of agricultural liming material and that all but a relatively few acres in this nation could produce more and better crops if more lime were applied to them.

Furthermore, [you say] . . . "Too, the government's soil bank program —if it's adopted—may cut back agricultural lime consumption to even lower levels . . ."

Everyone I have talked with—agronomists, legislators, administrators, and members of this industry—fully expects that the conservation reserve phase of the soil bank program will substantially increase the use of agricultural liming material if it is passed.

ROBERT M. KOCH
Executive Secretary
National Agricultural Limestone Institute Inc.
Washington, D. C.

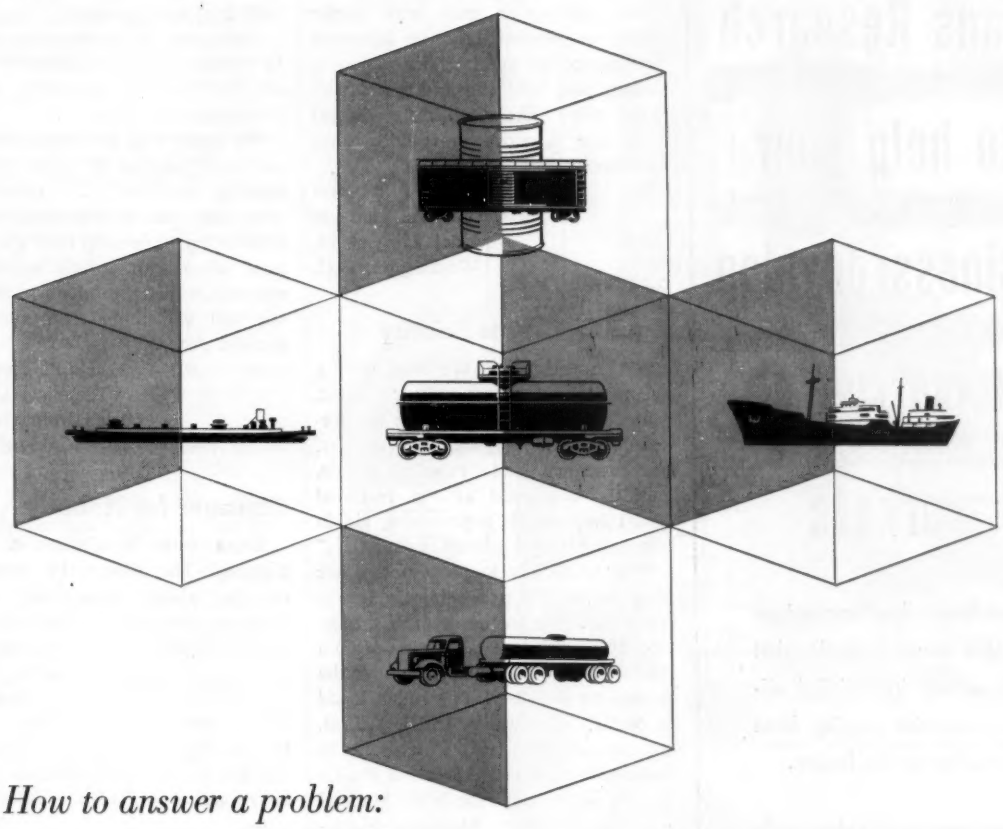
DEAR MR. HYYPIA: Congratulations on a good article on chemical lime . . . (*March 17*). This is most timely, since many chemists and chemical engineers, who should know better, still consider lime primarily as something the farmer spreads on his land and/or an ingredient in mortar and plaster. Its real future, as you have so aptly pointed out, lies in the chemical field.

There was one phase of this article that might be misleading to your readers. This involves your comment on 260,000 tons of burned lime used in agricultural liming. You seem to imply that this is the farmer's only source of liming materials. Actually, in 1954 a total of over 19.5 million tons of liming materials were consumed by farmers in the U.S. The big bulk of this, over 19 million tons, was pulverized limestone, which, of course, sells at a small fraction of the price of quick and hydrated lime. The reason there is still burned lime

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

DOW



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Dow's Alkali Sales Department will gladly look into the economics of *your* caustic use . . . and may well be able to point out surprising *savings*. So many services are yours—*dependably* yours—when you deal with Dow. THE DOW CHEMICAL COMPANY, Dept. AL 360B-1, Midland, Mich.

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consumption in agriculture is that many farmers growing truck crops, who have a high potential dollar value tied up in each acre, prefer quick or burned lime to limestone because of its much faster action in neutralizing acid soils. It reacts with soils more like fertilizer, whereas limestone is more of a long-range soil conditioning agent.

ROBERT S. BOYNTON
General Manager
National Lime Assn.
Washington, D.C.

Squibb Claims Priority

TO THE EDITOR: We read with a great deal of interest your article, "New Heart Drugs: Top Job for Research" (*March 3*), and, in particular, the statement that "Procaine amide, recently developed at the National Heart Institute, is a promising aid in correcting irregular heart rhythms . . ."

We would like to point out, if we may, that in 1950, procaine amide was made available to the medical profession by Squibb [now a division of Olin Mathieson Chemical Corp.] under the tradename Pronestyl. It was developed in our laboratories by Mr. W. A. Lott, director of Medicinal Chemistry, in conjunction with Dr. Bernard Brodie and his associates in the NYU Medical Division-Goldwater Memorial Hospital. Dr. Brodie has since joined the National Heart Institute as Chief of the Laboratory of Chemical Pharmacology.

ROLAND J. DAHL
Vice-President
Director of Research and Development
E. R. Squibb & Sons
New York

Wise Ones Won't Wait

TO THE EDITOR: Your recent article, "Inhibitor Users Don't Wait," (*Feb. 25*) we read with interest. We have been aware of the situation also, for years.

In regard to HSPA's H-51, . . . we have made and supplied mixtures of polyphosphates and chromates for over 6 years and know of competitors who have done the same for more than 10 years, in the treatment of air conditioners, heat exchangers, etc.

In the past three years of research and extensive tests, we have developed and are marketing . . . an all-round corrosion inhibitor — "O'B-Hibit" (patent pending). It is exceptionally effective with the usual industrial acid cleaners. . . .

Last year, a combination of acid, O'B-Hibit, and O'B-Solvent was successfully used in increasing oil well production in Texas. . . .

We agree with you, specialties makers must always be alert to catch opening markets; . . . nevertheless, wise customers do not waste valuable time trying to develop their own products, when with a little search they may easily find a product on the market that will more than meet their specific needs.

H. B. TROMBLEY
Technical Director
O'Brien Industries, Inc.
Caldwell, N. J.

Changes for Nobody

DEAR SID: Is CHEMICAL WEEK slipping? The March 17 cover was orange, which is certainly not a favorite color for St. Patrick's Day, and the March 24 cover was green.

J. M. WAFER
New York

Sure, and it was a sad day for Editors Burke, Callahan and McCarthy. But CW's color cycle changes for nobody—not even St. Pat.—ED.

Trash Wagons, Chariots

DEAR SIR: Your article "Captain Takes Another Look at the Team" (*March 24*) is sufficiently stimulating on a sufficiently important subject to encourage me to comment.

It seems to me that the difference of opinion, not only among members of your panel, but also throughout the industry, is principally due to the fact that the word "team" is an abstract one with different meanings for different people. One executive uses it as a means of increasing control of his subordinates, while another sees it as a means of increasing the efficiency by a synergistic effect.

The key, it seems to me, is the personality of the leader. The horses that pull a trash wagon are a team just as surely as those that pull a chariot. The major difference is the ability and attitude of the leaders.

CARL PACIFICO
American Alcolac Corp.
Baltimore

SEE YOU THERE

American Society of Biological Chemists, spring meeting, Atlantic City, April 16-20.

American Institute of Chemical Engineers and University of Pennsylvania, 4th annual meeting on "Experience in Industry," Museum Auditorium, Philadelphia, April 17.

National Industrial Research Conference, theme, "Research for Profit," Sherman Hotel, Chicago, April 18-19.

National Industrial Health Conference, meeting, Convention Hall, Philadelphia, April 21-27.

American Management Assn., conference on systems planning and control, Hotel Roosevelt, New York, April 23-24.

American Zinc Institute, 38th annual meeting, Hotel Statler, St. Louis, April 23-24.

American Oil Chemists' Society, Shamrock Hotel, Houston, April 23-25.

Assn. of Consulting Chemists & Chemical Engineers Inc., symposium and banquet, 5:00 p.m., Hotel Belmont Plaza, New York, April 25.

Society of Plastics Industry, Midwest plastics conference, French Lick-Sheraton Hotel, French Lick, Ind., April 26-27.

National Sanitary Supply Assn., 33rd annual trade show, Conrad Hilton Hotel, Chicago, April 29-May 2.

American Management Assn., conference on managing foreign operations, Hotel Roosevelt, New York, April 30-May 2.

Chamber of Commerce of the U.S., 44th annual meeting, Washington, D.C., April 30-May 2.

American Institute of Mining & Metallurgical Engineers, mining and metals branch, regional conference, Olympic Hotel, Seattle, May 3-5.

American Institute of Chemical Engineers, meeting, Roosevelt Hotel, New Orleans, May 6-9.

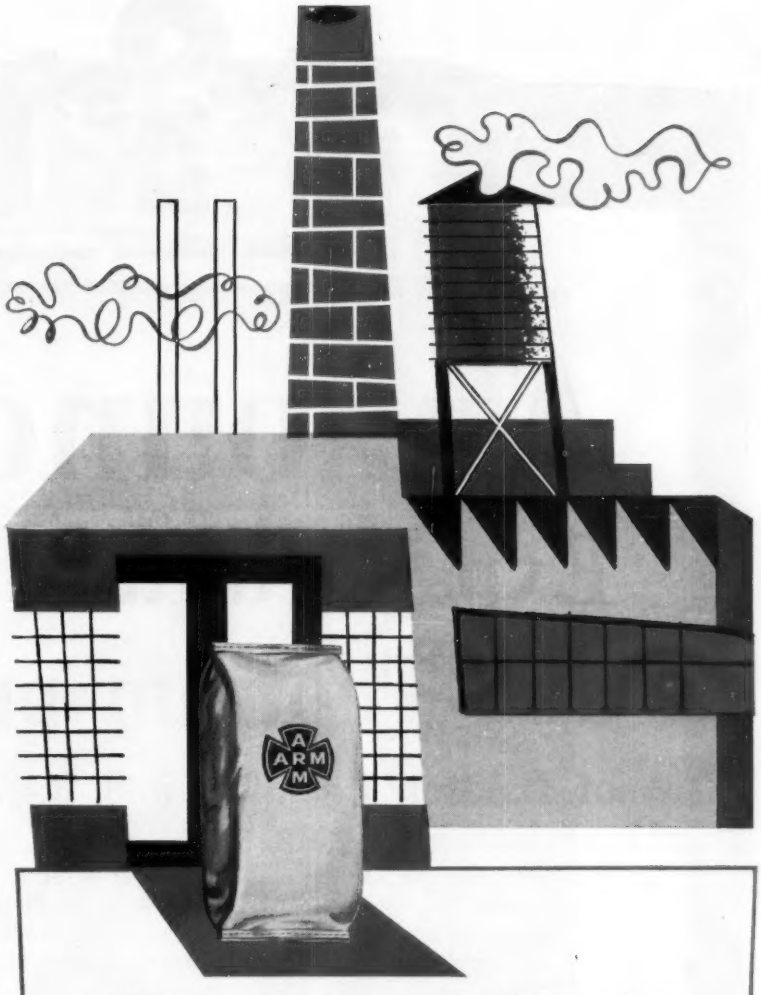
American Water Works Assn., Diamond Jubilee Conference, St. Louis, May 6-11.

American Welding Society's annual spring meeting, sessions on nuclear reactor components and designing for higher working stresses in pressure vessels, Hotel Statler, Buffalo, May 7.

Assn. of Food and Drug Officials of the U.S., 60th annual conference, Hotel New Yorker, New York, May 7-11.

American Institute of Chemists, 33rd annual meeting, Hotel Statler, Boston, May 10-11.

Chemical Market Research Assn., meeting on "The Chemical Industry—Review and Forecast," Biltmore Hotel, New York, May 14-15.



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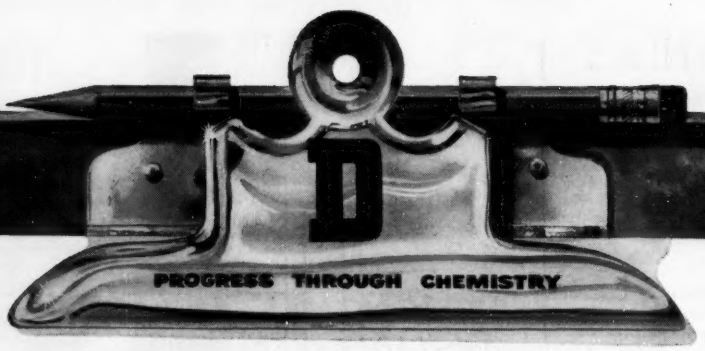

Announcing

Expanded Rare Earths and Thorium program

of Davison Chemical and Rare Earths, Inc.

Davison Chemical Company, Division of W. R. Grace & Co., and Rare Earths, Inc., Pompton Plains, N. J., a wholly-owned subsidiary of Grace, have joined in a program of expanded production, sales, research and development of thorium, cerium and other rare earths compounds.

Rare Earths, Inc., organized in 1947 for the production of Rareox, an optical quality cerium oxide polishing powder, has diversified into thorium, cerium and other rare earth chemicals. Now, additional facilities are being installed at Davison's Curtis Bay (Baltimore) plant. This means added service plus intensified research and development.

Current applications, in addition to thorium as a potential source of atomic energy, are glass polishing, glass coloring and decolorizing, as a component in carbon arc electrodes, in lighter flints, and for ferrous and non-ferrous metallurgical alloys.

Rare Earths, Inc., an affiliate of Davison Chemical Company, Division of W. R. Grace & Co., offer a quality line of thorium and rare earth chemicals. Contact your Davison Sales Office for additional information on these interesting and useful products.

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Chemical Week

April 14, 1956

PHOTOS—LYN CRAWFORD

Catalin's Krehbiel (left) and Reichhold's Reichhold—

They're Planning a Public Future

WITHIN the next three months, the chemical industry should welcome a new corporate entity to the chemical scene. Its name: Reichhold Catalin Industries, Inc. At least, that's the present plan.

Observers, by now, have come to regard with wonderment the courtship between Reichhold Chemicals, Inc. (RCI), and Catalin Corp. of America. It has been fraught with denials, surprise bids (for a directorship), approvals, disagreements, agreement to merge, cancelled merger plans, and now, a final okay to go on with the wedding.

Still Ahead: All that's needed now is Catalin stockholder approval, almost sure to be forthcoming at a special meeting in June.

Both companies' boards of directors have already given their okays, and Reichhold stockholder accession is unquestioned since Henry Reichhold, currently RCI's executive committee chairman, owns 87% of his firm's stock. (There are, however, some 150 other stockholders.)

Combined assets of the new RCI (a fortuitous, and not wholly coincidental, choice of trademark) will be close to $30 million; joint sales for '56 should hit close to $100 million.

Upon merging, stockholders of Reichhold Chemicals, Inc., will receive 2.8 shares of the common stock of the merged company for each of their present shares. Catalin stockholders will retain their current equity.

Also figuring in the agreement: a substantial amount of stock to be received by present Reichhold stockholders will be placed in a voting trust to be administered jointly by Reichhold and Catalin officers. For present Catalin

'Now we can get money for faster growth.'

stockholders, these terms are slightly more favorable than the ones agreed upon back in Oct. '55 (when Reichhold owners would have received a three-for-one exchange).

Why the Break? One month after this three-for-one offer was made, merger negotiations were broken off by mutual consent.

As Catalin's President Harry Krehbiel (he's slated to become president, too, of the new RCI) explains: "Last fall both firms agreed to disagree. Nothing personal was involved. Actually we wanted Reichhold to supply more detailed product-line costs, which we felt were essential to us in order to appraise the company's worth. Furthermore, we wanted to wait for 1955 sales to be tallied for both companies."

And, as Henry Reichhold himself admits, complete revamping of his firm's accounting system was being undertaken while the first merger negotiations were under way.

Now with Reichhold's bookkeeping system 90% revamped, Catalin sees Reichhold with a "fresh eye."

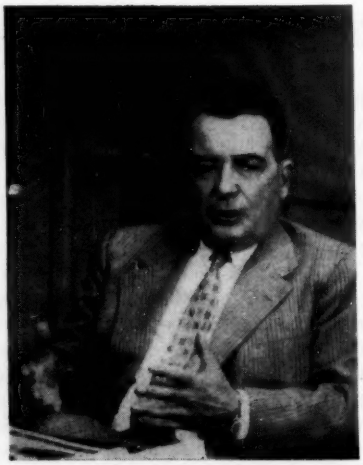
Predicts Krehbiel: "There's little chance of Catalin stockholders turning thumbs down on the merger, especially in view of the new terms and Reichhold's re-evaluation of its own cost accounting procedures." With merger finally in sight after some 20 months of ups and downs, what's the new RCI's immediate future? As far as Reichhold operations are concerned, the merger means:

- Public, rather than private, ownership. Access to new capital to finance major expansions, diversification.
- Immediate diversification into polystyrene, which Catalin produces at its Calumet City (Chicago) plant (now operated by Dow). Approximately 54% of Catalin's $20.5-million sales in 1955 were polystyrene.
- Diversification into the rapidly growing oil additives field (oil additives now account for roughly 12% of Catalin sales).
- Increased captive outlets for phenol, formaldehyde, and other basic chemicals.
- Substantial savings in raw material and finished product distribution cost since both Reichhold and Catalin plants and warehouse facilities are strategically located in various major markets.

For Catalin (which will operate as a division of the new RCI), consequences of merger are equally weighty. Catalin acquires:

- Reichhold's raw material productive capacity (phenol and formaldehyde are especially important to Catalin), which plugs a major weak spot in Catalin's structure—lack of raw material producing facilities.
- A toe-hold in foreign markets and technical know-how. Reichhold operates in 23 countries. Its unconsolidated foreign sales totaled some $42 million in 1955 (domestic sales were $53.6 million last year, and profit hit $2.1 million).
- Operation and distribution cost savings inherent in straight line production and integrated distribution.

The new RCI's governing body will be 12 directors, chosen from Reichhold's existing board of 10 and Catalin's board of 9 members. They'll pilot the equity that 3.8 million public shares represents.



'Our drawback was lack of raw materials.'

Reasonable Resurvey

The government may change its mind and give fast tax write-offs to companies that build new butadiene plants.

That's the possible result, now that Defense Mobilizer Flemming has backtracked on his decision (*CW, March 17, p. 21*) that no new butadiene expansion incentive was needed. He's now ordered the Interior Dept.'s Oil & Gas Division to restudy the situation that it had checked into only a month before.

The reason for the restudy is a new and higher estimated military demand for petroleum alkylate, which, like butadiene, can use refinery butylenes as a raw material. The question: whether a wartime step-up in military gasoline requirements could mean a shortage of butadiene for rubber.

Interior's previous survey found that nearly all the 279,000 tons/year of planned butadiene expansion is designed to use butane as starting material, rather than butylenes. So, in case of war, rubber production would not be severely crimped even if some butylenes now going into butadiene were diverted for fuel use.

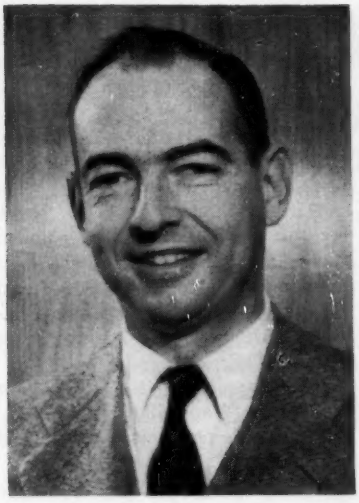
Needed Assist? This picture, Interior suggested to Flemming, showed no need for a government assist to get even more butadiene capacity.

But then Interior officials returned the letter, asking that it be withdrawn. The Pentagon, they explained, had just come through with new requirement estimates, which knocked Interior's survey findings askew. So with Flemming's approval, Interior is starting a new survey.

Speculation on the nature of the Pentagon's bombshell is that the military is impressed by the promise of more efficient engines that use higher-compression ratios; and, higher-compression engines need high-octane gasoline.

To Interior's Oil & Gas officials, this adds up to considerably greater capacity than anticipated heretofore.

So it's quite possible that companies planning butadiene-from-butane units may well be on the receiving end of a new round of fast tax write-offs.



SCHULTZ: For Shulton, a public stock sale, more capital, mean . . .

New Spice for Old

Another privately held company last week put in a successful bid for more diversified ownership. The company: Shulton Inc. of Clifton, N.J., which had 220,000 shares of common stock quickly snapped up.

Shulton, originally a manufacturer of toiletry items, recently tested a new avenue for profits—chemicals—and the result has been a buzzing crescendo of activities by its chemical division. Sales last year amounted to $2.6 million, 10% of the company's total. Where Shulton doubled total sales in 5 years, it increased chemical sales by 10-fold in the same period.

Of the stock sold last week, the families of President George Schultz and Treasurer Alfred T. Stanley disposed of 130,000 shares. The other 90,000 shares were previously authorized, but had never been issued by the company.

Since the chemical division is showing the most promise, growth-wise, the biggest slice of the $1.5-million in new money gained by the sale will be channeled into chemical production.

First Step: In 1950, Shulton built its first plant facilities to produce its own chemical raw materials. Now, Shulton reports, it is the principal producer of certain benzyl esters, eugenol, nitro musks, synthetic menthols and heliotropine. Other chemical products: vanitrope, desoxycholic acid, ergotamine tartrate, plating additives,* detergent and sun-screening chemicals.

Early in '55, Shulton acquired A. Maschmeijer, Jr., Inc., manufacturer of musks, menthols and other fine chemicals—a purchase that will be the first of several chemical acquisitions. Shulton officials, however, are understandably reluctant to discuss the other specific possibilities.

Shulton also has definite long-range commercial production plans for several pharmaceutical intermediates. In addition, it is checking into the general prospects of industrial chemical manufacture. Present research activities are broad enough in scope that Shulton will be able to appraise all areas of chemical manufacturing except such heavy industrials as inorganic acids and bases or solvents.

It's a good bet that Shulton will need still more capital if it should decide to plunge wholeheartedly into additional phases of chemical manufacturing. However, since last week's sale was so successful—the price was up 12% by last weekend—new stock issues might be the answer. And Shulton has some 450,000 common stock shares authorized but unissued.

Union Fission?

When two international CIO unions that represented chemical and oil workers merged last year, there was question in some labor specialists' minds as to how well the sometimes diverse interests of the two groups could be melded.

This week, a situation that could test the merger was boiling up—fear on the part of certain local chemical unions that they might be overruled by oil union men. Involved: the new AFL-CIO Oil, Chemical and Atomic Workers Union, and several powerful Niagara Falls, N. Y., locals representing some 8,500 chemical employees.

Several results are possible: Representatives of the Niagara Falls locals could challenge the policies of OCAW President O. A. (Jack) Knight at this summer's union convention; the locals could disaffiliate from the AFL-CIO union; or the matter might be cleaned up with no further conflicts. But the situation is certainly the most serious to be faced by Knight and by Elwood Swisher, former head of United Gas, Coke and Chemical Workers, who became a vice-president of the merged group.

Going Critical: While there had been some latent dissatisfaction among Niagara groups, the conflict flared up when union headquarters in Denver ordered one of its three District 15 (Niagara Falls) staffers, Anthony C. Sabatine, to a new post in Texas.

Local union officers and the district council immediately protested. A mass meeting of about 1,000 members promised "drastic action" if the international did not rescind the order.

When he heard of this furor, Knight expressed surprise, but refused to cancel the transfer, despite a reported intercession attempt by AFL-CIO President George Meany. Instead, the other two staff members were also transferred—Clifford Myers, to Chicago, Floyd Beebe to Newark, N.J.

At this point, Sabatine announced he would resign, "effective immediately." He did, and has been offered a job with another Niagara Falls union group.

Next Move: By late last week, however, tempers were cooling. At a meeting April 5, leaders agreed that disaffiliation with the international union was not a wise course.

The international's executive committee, however, has scheduled a meeting April 20-22 at Niagara Falls; it will discuss the problem with local union heads at that time.

Civic Sidelights: In addition to the main issue, it was also revealed that Knight had banned union representatives from running for political office, on the grounds that they owed their time to the union. Sabatine is the one Democratic member of the Niagara Falls city council; Myers had announced his candidacy for the city board of education.

Too, OCAW may become involved in still another Niagara Falls controversy. Hooker Electrochemical has joined with the independent union that represents its employees in asking the National Labor Relations Board for an election to determine whether employees at Hooker's own plant and that of its recently acquired Niagara Alkali Division (represented by OCAW) should be represented by a single bargaining unit.

*Including, oddly enough, the perfume ingredient heliotropine, which is one of a family of additives that can be used in making bright plate finishes.

UDD: He plans to parlay dollars from red mud slag.

Stir over Mud

In the past few weeks, Strategic Materials Corp., a five-year-old, little-known Buffalo and Montreal mining and mineral processing firm, has been creating a stir on the chemical front.

Last week, aluminum producer Reynolds Metals admitted that earlier this year it discussed with the firm the possibility of a joint effort to exploit Strategic's new recovery process for aluminum waste. Now, however, Reynolds says plans have gone no further, pending good results of Strategic's pilot runs with the process.

On the other hand, Strategic's President John Udd has just revealed successful completion of its experiments to produce aluminum and titanium oxides (as well as iron) from high-ferrous bauxite, and red mud slag—the waste remaining after the bauxite has been converted into aluminum. The test shipment of red mud came from one of the two major U.S. aluminum companies, with whom Strategic is now negotiating over use-rights on this particular process.

More than Mud: Aside from this stir over mud, Strategic has several other metallurgical waste processes in the works that could count heavily in the firm's chemical growth.

Most important is a process for obtaining ferromanganese from low-grade manganese-bearing ore. Strategic expects to complete by mid-summer a $1.5-million prototype plant at Niagara Falls, Ont., where it hopes to iron out any process bugs. The company expects to follow this up with a full-scale, 75,000-tons/year smelter near Woodstock, N.B.—site of Strategic's own manganese reserves.

Besides the aluminum and ferromanganese projects, the firm is working on about eight other processes developed by Marvin Udy, working for its Strategic-Udy Metallurgical and Chemical Processes subsidiary (80% owned). Udy, a well-known U.S. metallurgist, is the firm's technical consultant. Most important of his processes are:

- An electric furnace method to recover ferrosilicon, magnesia and nickel from asbestos mine wastes.
- A process to recover iron and sulfuric acid from waste pickle liquors, now being dumped by steel mills at a near-600-million-gal./year rate.
- Process to produce pig iron from unbeneficiated low-grade ores.

Another process, in which 100% calcium carbide is produced by a continuous furnace method, is still high on SMC's list. Temporarily, however, it has been pushed into the background by the afore-mentioned processes, which have triggered more-than-casual response from aluminum and steelmakers.

EXPANSION . . . .

Sulfuric Acid: Stauffer will build a new sulfuric acid unit at Dominquez, Calif., at a cost of about $2 million. The firm already operates three sulfuric plants in California—at Richmond, Vernon and Dominguez.

•

Urea Resins: Monsanto has more than doubled its capacity to produce cyclic urea resins at Everett, Mass.

•

Petrochemicals: Suntide Oil, at its Corpus Christi, Tex., refinery, will build a multimillion-dollar unit to upgrade gasoline, and produce aromatics and miscellaneous petrochemicals.

•

Polyvinyl Resins: Goodrich Chemical will spend $8 million to nearly double polyvinyl resins and plastic compound capacity at its Avon Lake, O., plant. Construction begins in early June with completion expected by March '57.

•

Aluminum: Reynolds Metals may spend $100 million for primary aluminum production in the Baie Comeau area, 200 miles east of Quebec City, Can. Plans call for production of 100,000 tons/year of ingot.

•

Refractories: Harbison-Walker Refractories will build a basic refractories plant at Hammond, Ind.

Harbison-Walker has also begun construction of a $1-million plant at Ludington, Mich., which will kiln-treat magnesium compounds (from Dow's nearby unit) to produce industrial fire brick.

•

Ferromanganese: E. J. Lavino (Lynchburg, Va.) will spend $4 million to double ferromanganese output.

•

Cellulose Pulp: Procter & Gamble's Buckeye Cellulose Corp. will add new cellulose pulp capacity at its Foley, Fla., mill, doubling the present output to 240,000 tons/year of pulp. Cost: $20 million. Completion is expected by mid-1958.

•

Paper Pulp: Great Lakes Paper (Toronto, Ont.) is planning a $35-million expansion at its Fort William, Ont., plant.

- Allied Paper Mills Division of Thor Corp. has obtained 122 acres east of New Castle, Colo., for a proposed pulp mill. Construction of the plant is contingent on winning a government contract, on which bids will be opened April 27 in Denver.

•

Canadian Industries Ltd. will spend $250,000 to increase explosives production facilities at Beloeil, Que., and a similar amount to expand nitric acid capacity at its Nobel works in Ontario. In addition, the firm is considering expansion of its $14-million polyethylene plant at Edmonton, Alta.

•

Petrochemicals: Truland Chemical, Division of Trubek Laboratories (East Rutherford, N.J.) will triple its refining capacity (to 100,000 gal./month) for producing petrochemical by-products at Union, N.J.

COMPANIES. . . .

Air Reduction will reoccupy the former war plant at Rochester, N.Y., which it abandoned several years ago. The firm recovered oxygen and other gases there for the government for war industries.

Washington Angles »

» **That atomic accident** reported in *CW Washington Angles* last week has brought a surprising comment from Atomic Energy Commission chief Lewis Strauss. Astonishingly, he claims his first knowledge of the Nov. '55 mishap, in which a runaway reaction melted a reactor core at the Arco, Idaho, test station, came when a *Wall Street Journal* reporter asked him about it last Thursday.

The Arco station, incidentally, will have a new interest for chemical makers. A diphenyl-moderated reactor will be built there by a division of North American Aviation.

» **"We can make any paint you want"**—that's what over 100 paint manufacturers are telling the Pentagon, which finally gave them specifications for the 33 paints now produced at the Navy's own plants. Industry officials hope this response will overcome Congressional objections to closing down paintmaking operations at Mare Island, Calif., and Norfolk, Va.

» **The proposed patent fee increase** may be scaled down before it gets through Congress. The bill is now pigeonholed by the House Rules Committee, but may be allowed up for a vote since sponsors have agreed to reduce the proposed increase to merely a $10 boost in filing and final fees. There'd be no rise in charges for extra claims, sheets of drawings or specifications.

» **Professional manpower shortages** have been recognized by President Eisenhower, who named the president of Ohio State to head a group that will coordinate development of "more highly qualified technical manpower." It will promote ideas for a grass-roots attack on such shortages.

» **New food preservation developments** using atomic radiation will be discussed April 17 in the Commerce Dept. auditorium in Washington. Government experts and 40 food industry representatives will review the subject in a panel that will highlight the government's second annual atomic conference.

One conference sponsor, the Army Quartermaster Corps, will show samples of meat and other food treated with gamma and beta rays.

Clorox Chemical Co. directors have declared a 100% stock dividend.

•

Eli Lilly has arranged to purchase all the capital stock of Corn States Laboratories, producer of hog cholera serum and vaccine.

•

Nuclear Corp. of America has acquired the assets of Research Chemicals, Inc. (Burbank, Calif.), for 22,222 shares of Nuclear's Class A stock.

•

Borden has acquired Resin Industries (Santa Barbara, Calif.), manufacturer of vinyl and other molding compounds. Resin Industries will operate as a wholly owned subsidiary.

•

Canadian Cellu-cotton Products (Niagara Falls, Ont.) has changed its name to Kimberly-Clark Products Ltd. Kimberly-Clark Corp. (Neenah, Wis.) purchased the firm last year.

•

U.S. Sulphur, with reserves equivalent to 500,000 tons of pure sulfur in Dolores County, Colo., has been sold to Texas-Adams Oil Co.

•

Texize Chemicals (Greenville, S.C.), industrial and specialty chemical manufacturer, has issued convertible debentures to help finance plant expansion at its Mauldin, S.C., site.

•

Two new chemical companies have been incorporated in Dover, Del.:

- Lake Charles Chemical Corp., with $1,000 in authorized stock.
- Valentine Chemical Carriers Inc., with 2,000 no-par-value shares.

•

Union Oil (California) has agreed to sell $120 million of 3¼%, 25-year subordinate convertible debentures to Gulf Oil. Though not a merger, the transaction supplies Union with funds to help finance increased capital expenditures, gives the firm access to adequate crude oil reserves. Conversion of debentures into common stock (optional) would give Gulf a substantial interest in Union.

•

Interchemical Corp. shareholders will be asked (at the April 16 annual meeting) to approve increasing the number of authorized shares outstanding from 1 to 2.5 million. Plans for using the new shares haven't been set.

•

Chemway Corp. (New Brunswick, N.J.), manufacturer of pharmaceutical, cosmetic and specialty chemicals, has purchased E. A. Bromund Co. (Boonton, N.J.), refiner and processor of beeswax.

FOREIGN. . . . . .

Sulfuric Acid/Mexico: Industrias Quimicas de Mexico, Mexican affiliate of Stauffer's Consolidated Chemical Industries Division, will build a 130-tons/day sulfuric acid plant at Zacapu, Michoacan. Half of the plant's production will be bought by Celanese Mexicana for rayon use.

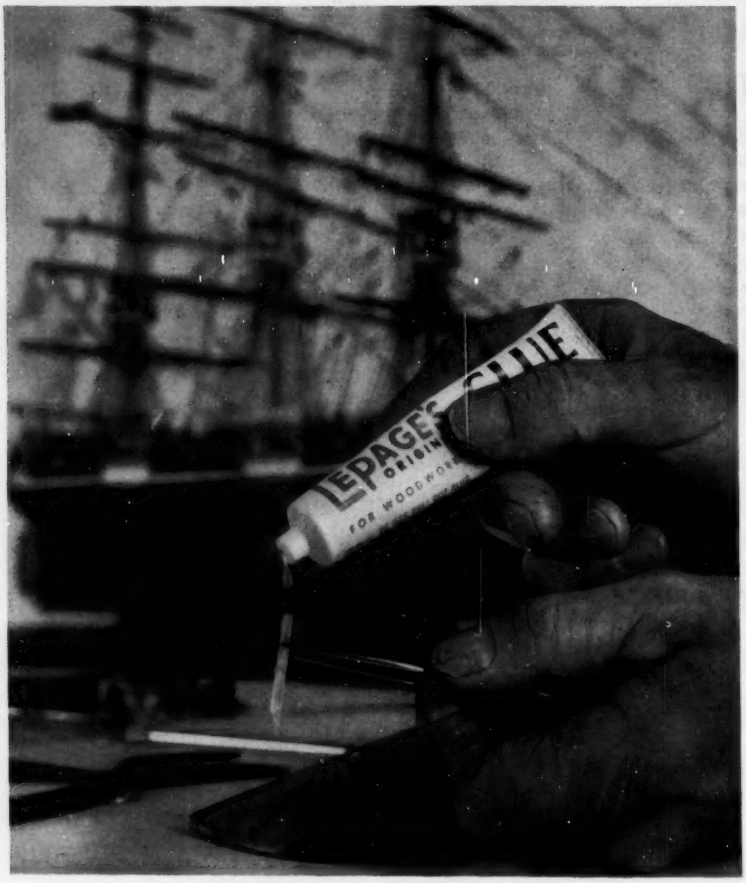
•

Expansion/East Germany: Under East Germany's new Five-Year-Plan the VEB Chemische Werke Buna in Schkopau will hike production 15-20% over last year. Special emphasis will be on polyvinyl chloride. Production schedules for 1956 call for 560,000 tons of calcium carbide, 70,000 tons of lye, 75,000 tons of GR-S and 26,000 tons of PVC.

•

Synthetic Rubber/Baghdad: Now being negotiated in Iraq is a new plant to be built near Baghdad that is initially designed to meet half of Iraq's synthetic rubber requirements. A detailed outline of a project to produce GR-S from petroleum has been submitted through the Iraq embassy by

Bracon . . . SQUEEZE-TO-USE PACKAGING



OLD HANDS — take to new ideas

For 77 years, glues and pastes of LePage's of Gloucester have been helping hobbyists and homemakers. Today, their "Original-Glue" and four other LePage products are newly packaged for consumer convenience in Squeeze-to-Use BRACON plastic tubes. Twelve different sizes, ranging from ¼ to 5 ounces in capacity, are in use and being filled and sealed on regular mass production schedules.

There's no trick to squeezing just the right amount of glue — or any product — from these BRACON polyethylene tubes. Relax the squeeze and there's no drip or overflow. Their lightness, color, and brilliant printing catch the consumer's eye at point-of-sale. Flexible and crack resistant, BRACON tubes hold *their* shape and *your* product identity to the last squeeze.

How recently have you reviewed your packaging in terms of complete costs and merchandising advantages? Let your BRACON representative show you how these new squeeze-to-use tubes or bottles can help you.

BRADLEY CONTAINER CORPORATION

Maynard, Mass. — *New York, Chicago, Los Angeles*

Burke Research Co. of the U.S. Burke has offered to construct and operate the new unit. The plant could later be expanded to meet all of the country's requirements, with any surplus going to Mideastern markets.

•

Polyethylene/Argentina: Construction of the first in a series of plastics plants for Monsanto's international division is scheduled to start by November. The new plant, to be located near Buenos Aires, is expected to produce enough polyethylene to satisfy all Argentina's demands.

•

Fertilizer/Egypt: Egyptian Fertilizer and Chemical Industries will boost its capital by $4 million with a new stock issue just approved by a special meeting of stockholders in Cairo. New capital will be used to expand ammonium sulfate capacity to 100,000 tons annually. Foreign experts estimate the cost of the new installation at nearly $9 million.

•

Butadiene/England: Esso Petroleum will build a new butadiene plant at its refinery in Fawley, near Southhampton. Output will be fed into a new plant to be built on an adjacent site by the International Synthetic Rubber Co. Output from these two plants, scheduled for completion in 1958: 50,000 tons of GR-S annually.

•

Titanium Find/Venezuela: Deposits of titanium minerals have been discovered near Puerto Cabello, 140 miles west of Caracas. Oscar Rivero, a Venezuelan engineer, has filed eight claims covering an area of nearly 10,000 acres in the Patanemo and Borburata mountains, a desolate jungle area.

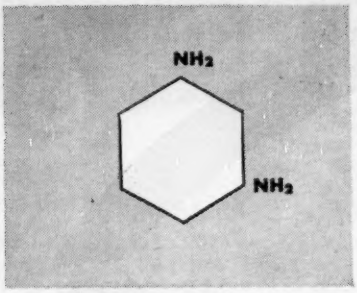
•

Acrylonitrile Fiber/Japan: Sumitomo Chemical Co. of Japan will set up a $2.2-million plant at its Nihama factory to manufacture Creslan. American Cyanamid, which perfected the acrylonitrile-base fiber, will provide technical assistance. The new unit is expected to produce 5 tons daily.

Sumitomo also plans to set up a new $1.1-million plant at Iwakuni. This will be a joint enterprise with Toyo Spinning & Weaving Co., which will put up 50% of the capital. Scheduled for completion late this year, the plant will produce 1 ton/day of staple fiber.

CAN YOU PICK THE RIGHT ANSWERS IN THIS

30-Second Quiz on Intermediates?

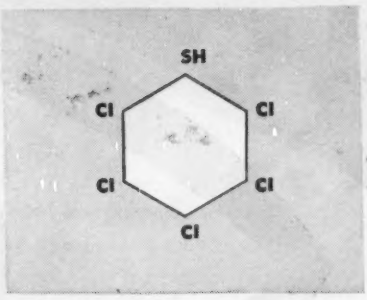


1. Du Pont m-Phenylenediamine is particularly useful as a:

- ☐ **A.** Emulsion stabilizer
- ☐ **B.** Epoxy resin curing agent
- ☐ **C.** Dispersion medium for colloidal sodium

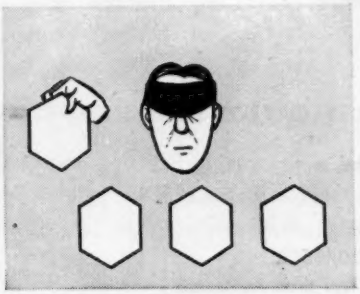
2. Weighed down by making your own chlorinated aromatics? A sure way to get out from under is to:

- ☐ **A.** Write to all major chemical manufacturers
- ☐ **B.** Let the chemist to your right do it
- ☐ **C.** Phone Du Pont



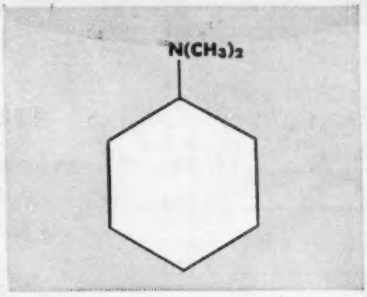
3. This is the formula for Du Pont Pentachlorobenzenethiol. We call it highly reactive because it:

- ☐ **A.** Readily forms metallic salts
- ☐ **B.** Is easily oxidized to the corresponding disulfide
- ☐ **C.** Will condense with aldehydes to form thioacetals



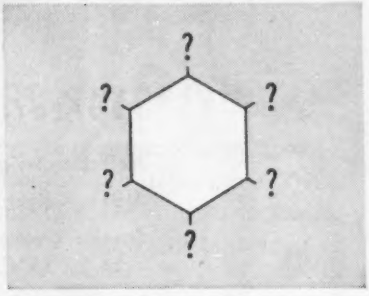
4. Picking out an intermediate and hoping is the hard way to solve your problem. The easiest and surest way is to:

- ☐ **A.** Study them all and then choose
- ☐ **B.** Select two at a time
- ☐ **C.** Let Du Pont pick one out for you



5. Meet Du Pont N,N-Dimethylaniline. You may have heard about its use as a:

- ☐ **A.** Promoter in polymerization of polyesters
- ☐ **B.** Toning agent for paints
- ☐ **C.** Stabilizer for polyvinyl chlorides



6. Suppose you have an unusual intermediate in mind. Your first move should be:

- ☐ **A.** Write Du Pont
- ☐ **B.** Consult Du Pont
- ☐ **C.** Call Du Pont by phone

• When you have any kind of problem in intermediates, be sure to consult Du Pont—manufacturer of the greatest variety offered by any chemical company. Du Pont specialists are ready to help you in the selection and application of intermediates at all times.

Now let's see how you did on the quiz. Answers: 1-B; 2-C; 3-ABC; 4-C; 5-A; 6-ABC. There's a complete line of Du Pont intermediates containing nitro, amino and sulfo groups. Consult us for the intermediate you need before attempting nitrations, chlorinations or reductions.

Just drop us a note and let us try to help. Address: E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Dept., Chemicals Div., Wilmington 98, Delaware.

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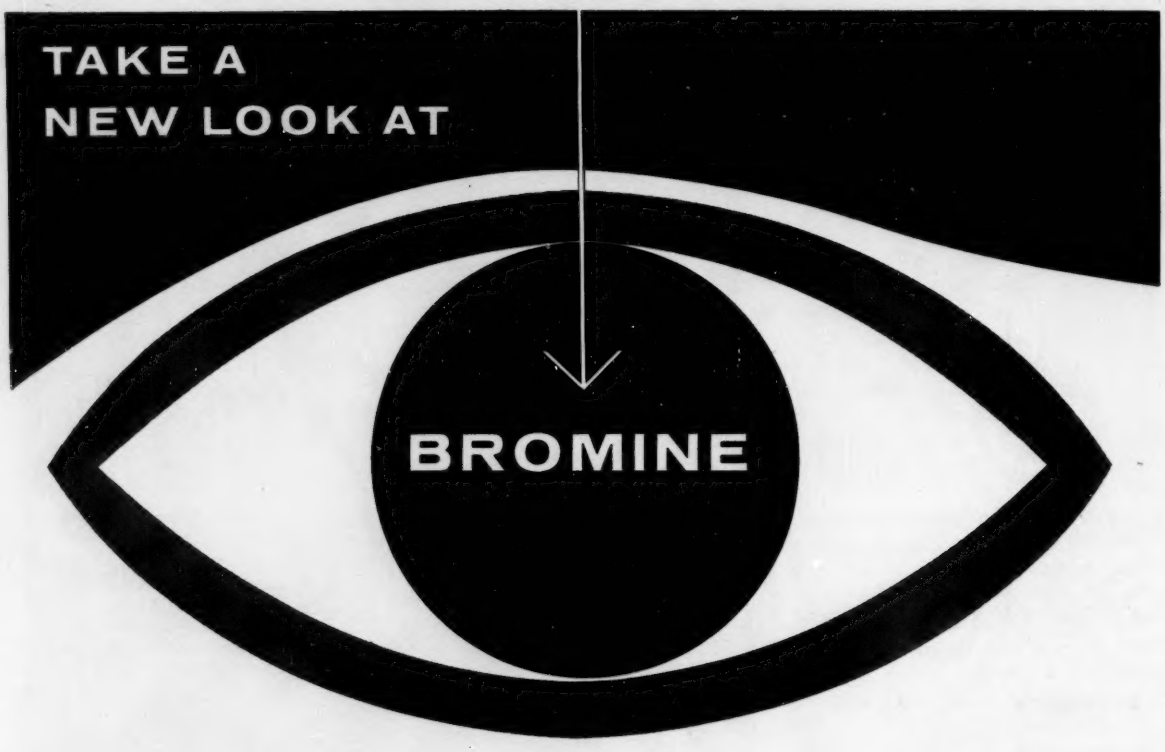
...THROUGH CHEMISTRY

ORGANIC CHEMICALS DEPARTMENT

TAKE A NEW LOOK AT



PROPERTIES:

Molecular weight.....159.83

Atomic weight.....79.916

Specific gravity at 20/15°C.....3.120

Pounds a gallon at 20°C.....26.0

Boiling point.....58.8°C.

Freezing point.....—7.2°C.

Freely soluble in alcohol, ether, carbon tetrachloride, chloroform, concentrated HCl, aqueous solutions of inorganic bromides.

SPECIFICATIONS:

Bromine, not less than 99.7%

Specific gravity at 20/15°C., not less than.....3.1

Chlorine, not more than 0.15%

Iodine .....None

Non-volatile, less than 0.01%

Water Content .....0.003% Maximum

A NEW BROMINE PLANT* at El Dorado, Arkansas, will provide a large, dependable source of high-quality bromine at lower delivered cost in volume. This added capacity to our present production from plants at Saint Louis and Manistee, Mich. permits active research on this basic chemical element to take advantage of bromine's unusual and unique properties and characteristics. Investigate the possibilities of bromine and bromides in your business.

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WHAT BROMINE OFFERS YOU

HIGHER YIELDS

Bromine compounds give higher processing yields in:

- Quarternary salt formations
- Williamson ether synthesis
- Alkylation of malonic or acetoacetic esters
- Reformatsky reactions
- Nitrile formations
- Hydrolysis to carbinols
- Ullmann reactions
- Grignard reactions in the aromatic series.

PROCESSING ADVANTAGES

- Oxidation potential of bromine is lower than that of elemental chlorine or fluorine. This minimizes decomposition of hydrocarbons in halogenation reactions.
- Melting points of bromides are higher than those of chlorides or fluorides. This usually makes isolation easier — an important advantage to the research chemist.
- Many reactions with brominated hydrocarbons may be carried out at atmospheric pressure and relatively low temperatures whereas the corresponding chlorides and fluorides require much more vigorous conditions to react. This may be an important processing advantage.
- Bromine is handled as a liquid — does not require pressurized equipment.
- Bromine compounds have exceptionally high densities — the highest of any organic compounds with few exceptions. This may be advantageous in processes involving liquid-liquid separations.
- The very low vapor pressure of brominated hydrocarbons may be an important advantage in some applications.
- Various inorganic bromides are useful catalysts in reactions involving intramolecular rearrangements.

NEW PRODUCT OPPORTUNITIES

- Bromine imparts greater fire resistance to organic compounds than low molecular weight halogens. This property has proved useful in fire extinguisher fluids and in fire proofing cloth. It might also have advantages in plastics.
- Bromine and compounds which readily release bromine are active germicides, bactericides and algicides.
- Bromine compounds are valuable in the manufacture of dyes because they impart unique color tones.
- New pharmaceuticals are possible with bromine compounds as intermediates.
- Bromine compounds are useful in the synthesis of photographic chemicals, vitamins, cosmetics and flavors.

Michigan Chemical will be glad to aid you with your present bromide needs, or to help you in basic bromine research. Write or phone us.

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New Organization Pattern for Growth

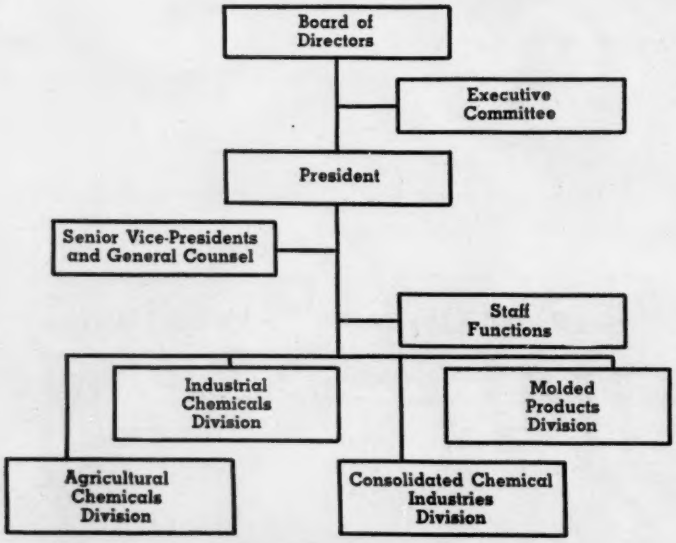
REGROUPING FOR MANAGEABILITY

- **In the old days, Stauffer got along fine with three divisions set up on a simple geographical basis . . .**

- But by 1952, the company had grown up and spread out to the point where not 3 but 12 department heads were reporting directly to the president . . .

Production
Industrial Chemical Sales
Agricultural Chemical Sales
Research
Engineering
Traffic
Credit and Insurance
Accounting
Employee Relations
Commercial Development
Exports
Purchasing

- **So this year, following more expansion, the company has been reorganized into "logical manageable segments" — chief of which are the four operating divisions . . .**



Oversize rompers aren't the answer to a grown-up's clothing requirements; and more or bigger departmental units won't meet the organizational needs of a once small, now large chemical company. In each case, a new pattern is called for.

So it is with Stauffer Chemical Co. (New York and San Francisco), which this week is breaking in a new organizational system that takes into account how this concern has gained bulk and stature since its early days as a strictly West Coast venture.

Nearing Top 10: Stauffer, the figures show, is now well up in the chemical "big time":

- Sales—up more than 100% over the past decade—are now in the neighborhood of $150 million/year, a rate topped by only about a dozen of the industry's giants.
- Total assets following last year's acquisitions — merger with Consolidated Chemical Industries and consolidation of Nyotex Chemicals—are now more than $120 million, will rise to about $145 million if the proposed merger with West End Chemical Co. goes through as expected.
- Operations now include 55 plants, mines and offices in 23 states, with more than 4,300 employees and 65 principal products, plus six 50%-owned associated producing companies in the U.S. and four 100%-owned subsidiaries in Argentina, Mexico and Germany; and $15 million has been budgeted for 1956 expansion.

Based on Products: By setting up four operating divisions based on product lines, Stauffer feels it has divided its operations into logical, manageable segments. Each divisional general manager reports directly to the president, submits divisional profit-and-loss statement monthly.

This is a far cry from Stauffer's old-time setup (*see box, left*), which was outmoded even before the company reached nationwide proportions. But it's strikingly similar to the organizational plans that the biggest chemical companies have deemed best suited to their bigness.

now...on stream from GAF's new high pressure acetylene derivatives plant at Calvert City, Kentucky...

3 POWERFUL VERSATILE SOLVENTS

for polymers, copolymers, hydrocarbon gases, and many other organic compounds

HIGHBOILING, STABLE, COLORLESS

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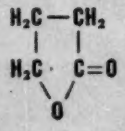


f.p. −44°C, b.p. 204°C, flash pt. 209°F. Soluble in water, alcohols, benzene, etc.

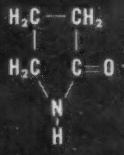
SOLVENT:

for polyacrylonitrile, cellulose acetate, polystyrene, shellac, etc. Selective solvent for acetylene in gas streams. Solvent in paint removers and petroleum processing.

OTHER USES:

Chemical intermediate for aliphatic and cyclic compounds. Cellulose acetate swelling agent for films and fibers.

2-PYRROLIDONE



m.p. 25°C, b.p. 245°C, flash pt. 290°F. Soluble in water, alcohols, benzene, etc.

SOLVENT:

for polymers, Chlordane, DDT, d-sorbitol, glycerine, iodine, and sugars.

POLYAMIDE CONDENSATION POLYMER:

Polymerizes to a high molecular weight, linear, nylon-like polymer, $[NHCH_2CH_2CH_2CO]_n$.

N-METHYL-2-PYRROLIDONE

f.p. −24.8°C, b.p. 202°C, flash pt. 204°F. Soluble in water, alcohols, amines, ketones, etc.

SOLVENT:

for acrylonitrile polymers and copolymers. Spinning agent for polyvinyl chloride solutions. Dissolves 39 times its own volume of acetylene from natural gas streams. Solvent for agricultural chemicals...phenyl mercuric acetate, 2,4-D, etc.

SPECIAL SOLVENT USE:

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These solvents are available in drums and tank car quantities.

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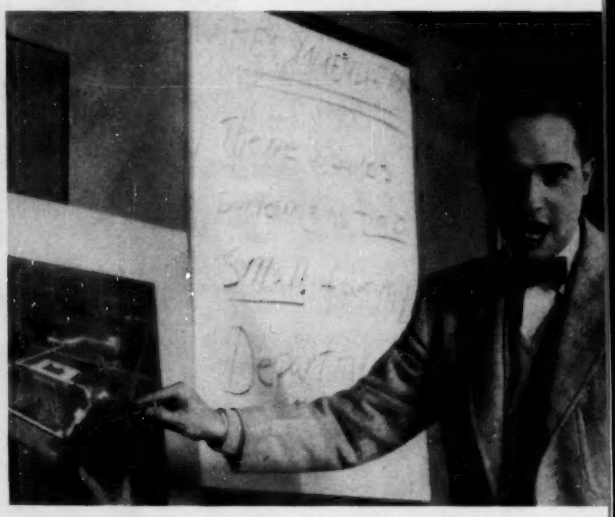


SPECIAL-INTEREST PLEADER

PERSONALITIES: Shrewd handling of these types can help you . . .

Put Less Time, More Meat in Meetings

All across the country, top management is looking vigorously for ways to lick one of its toughest problems—overly long and inefficient meetings. And in the vanguard is a Midwest chemical firm, Ansul Chemical Co. (Marinette, Wis.).

At Ansul, a management group is systematically assessing ways to shorten its product planning meetings and at the same time increase their effectiveness, using techniques developed by the firm's already-operating Management Meeting Clinics.

Impetus for the drive came when Ansul President Robert Hood recognized the increasing toll of meeting time on company business, began to explore the causes. From responses to a questionnaire sent to the company's top and middle management, he discovered that 25-60% of their working hours were being spent in meetings, with the highest proportions being spent at the top levels. Direct compensation for this time, exclusive of administration burden, was conservatively estimated at $96,000/year.

With that evidence to convince doubters, Hood initiated the clinics, starting with 17 men from top management in a series of six monthly sessions.

These dealt with the three elements basic to all meetings:

- Planning and housekeeping.
- Conducting.
- Psychology.

Planning: First, the men asked themselves, "Why have a meeting?", discovered a principle often overlooked, namely, a meeting is not an end in itself. From this followed the idea that stated meeting objectives must be related to some even broader objective of the planner. A subsidiary principle was that meetings are a manager's communication tool for getting work done.

Ansul determined that it could effectively use several kinds of meetings in its business: meetings to give or receive information, to make or "sell" decisions, to arrive at the solutions of problems.

But knowing what kinds of meetings were best did not solve the problems of planning. In preparing for meetings, such matters as who should attend, and how they should participate, were easy to overlook. Says Ansul, a meeting planner must know who's to be affected by the meeting's outcome, what mental and personal resources should be on hand to help in arriving at the objectives. Following up the membership list should be adequate notice of the appointment, the objectives of the meeting and reasons for each participant's invitation.

Negatively speaking, Ansul points out, meetings are often hampered by details that are seemingly unimportant in themselves, but which are really of prime significance when taken in the aggregate. As former training director Richard Beckhard summarizes in the company's clinic training outline, late starts, insufficient advance notice, outside interruptions and malfunctioning equipment can prove disastrous to an otherwise well-planned conference.

Conducting: To bring home forcibly the difficulties and pitfalls in running a meeting, Ansul has devised a set of skits in which clinic participants take part either as actors or as observers. In a typical skit, they discuss a problem that could actually come up at Ansul; for example, whether to drop a certain fire extinguisher model from the manufacturing line.

Observers are told which departments the actors represent, but are not told that the actors are simultaneously portraying various psychological types often found at meetings anywere (*see cuts*). The skits develop the factors that make conducting a meeting difficult. Such matters as digression, stifling of interest, failure to define problems and objectives, and lack of follow-up once a course has been charted, all come under close scrutiny. As the meeting continues,

AGGRESSOR

PLAYBOY

spectators become aware of the meeting-leader's importance and the difficulties inherent in harmonizing individual motivations.

One of the prime problems inherent in setting up and running a meeting, says Ansul, is the clarification of goals so that each member knows why he's there, can keep the discussion "on the track," and determine the degree to which he must subordinate his personal views.

Top man on the company's list of influences at meetings is the leader, whose personal attitude and ability can either provide stimulus or cause serious degeneration of effectiveness. The leader's responsibilities involve:

- Defining the problem and providing adequate information.
- Focusing and summarizing discussions.
- Identifying and testing various solutions.
- Determining readiness for a decision.
- Obtaining commitment to a decision.
- Guiding the decision-making.

But Ansul declares that leadership skills must be practiced by more than just the chairman. In fact, the company suggests, it's more desirable if all the participants in a meeting take some of the responsibility for leadership, since the decision will be better implemented if everyone has had a part in reaching it.

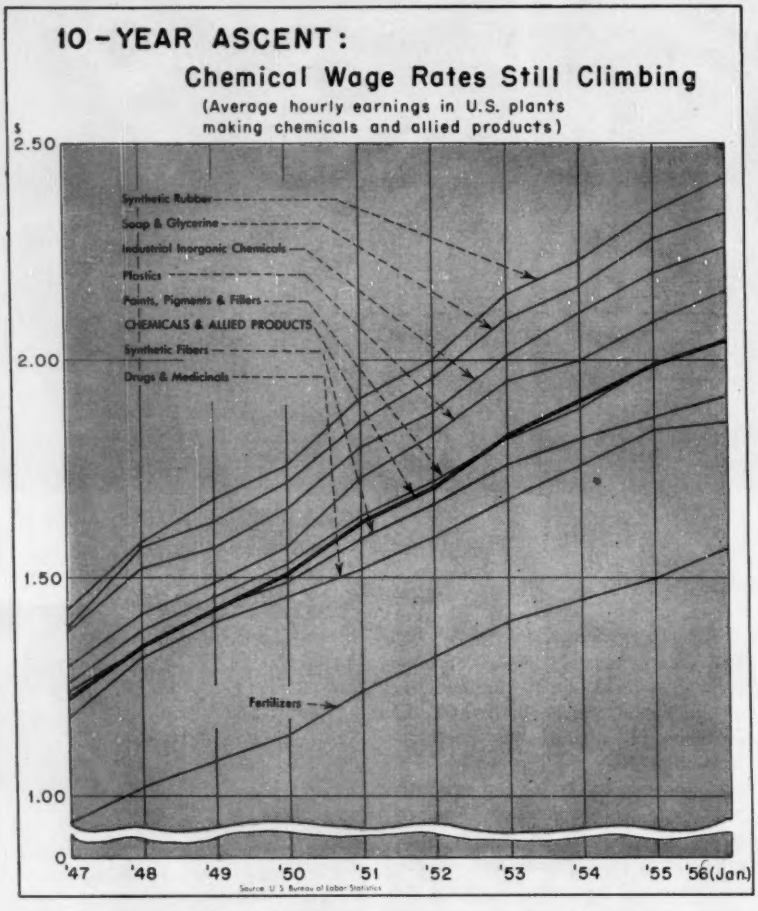
Psychology: Important to the success of any meeting, Ansul management discovered, are the harmonizing of individual personalities and the subtleties of superior-subordinate relationships that are represented. Diverse personality types can seriously hold back the group effort. Furthermore, the presence of two or three echelons of management can be discomfiting and confusing. To meet the latter problem, Ansul management encourages the bosses to act in supportive roles, encouraging their subordinates, helping to compromise constructively, and exhibiting a positive attitude.

The positive attitude, Ansul emphasizes, is particularly important since subordinates tend to act as they think their bosses want them to act. A leader, therefore, should make efforts to adjust his behavior to be positive rather than neutral or negative, so that lower-ranking employees will tend to respond positively. Such an approach by superiors also tends to increase feelings of security for individuals.

For Ansul, one of the most gratifying results of the clinics has been heightened awareness of the need to keep meetings on the track and to exercise constructive behavior. Above all, the clinics have developed leadership and participative skills that help maintain for the company an attitude of easy communication and friendly cooperation.

RECOGNITION SEEKER

BLOCKER



Workers into Capitalists

Up by more than 66% since 1947, chemical wage rates are now well above those in most other U.S. manufacturing industries.

This upward trend relative to other industrial wage levels—expected to continue through 1956—is boosting chemical plant employees into a higher economic stratum, transforming the industry's labor relations picture.

STILL moving higher in the ranks of best-paid workmen in the world are the production and maintenance employees in U.S. chemical process plants. Their average hourly earnings have now mounted beyond the $2 mark (*see chart*).

Today, these workers' pay rates rank eighth among wages of all 20 manufacturing categories*, having advanced from 10th place in 1947. In that year, the average hourly earning figure for chemical workers was 1¢ less than the all-manufacturing average; since then, the chemical figure has risen by 82¢/hour (66.7%) while the all-manufacturing average is up by 70¢ (56.4%).

Whether this upward climb relative to other industries' wage levels will continue through 1956 hinges on many factors—including future developments stemming from the current dissension within a major chemical labor union—but chances are that chemical wage rates will more than hold their own for the next nine months.

Bountiful New Pacts: Latest evidence bearing on this point comes from Midland, Mich., and New York City, where management and union officials have just signed bountiful new wage contracts that are more than likely to influence collective bargaining.

In New York, Lever Brothers and the International Chemical Workers Union (AFL-CIO) have a one-year agreement that calls for wage increases of 12 to 14¢/hour at five of Lever's six domestic manufacturing plants; and similar pay rises are in store for members of the Oil, Chemical & Atomic Workers (AFL-CIO) at the sixth plant. At Midland, Dow Chemical and District 50 of the United Mine Workers (Ind.) have negotiated a three-year pact providing for a 14¢ increase retroactive to March 5, with an additional 7¢ wage hike coming in 1957 and 8¢ more in '58. (The Dow accord also has an escalator clause that will mean an automatic 1¢/hour wage boost every time there's a half-point increase in the consumers' price index computed by the U.S. Bureau of Labor Statistics.)

Other factors:

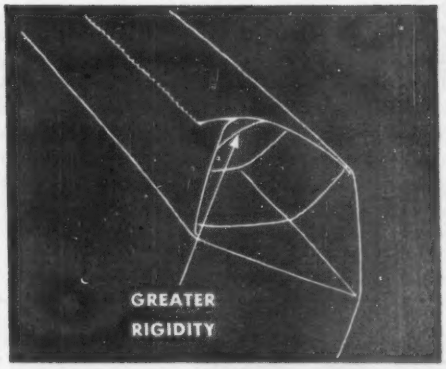
- Probability that chemical sales and profits will continue at high levels.
- Chance that more and more chemical companies will decide to experiment with long-term (two- or three-year) contracts, in which future wage rises are stipulated in advance.
- Expectations that there'll be significant wage increases this year in steel and a few other pacesetting industries.
- Possibility that company councils and subindustry councils—now being activated right and left by both leading chemical unions—may be coming into play by fall.
- Odds that those two unions—OCAW and ICWU—may consolidate their bargaining power by merging.

Effect on Workers: It's certain that inflation has pushed up cost-of-living to a considerable degree since the end of World War II's price control program in 1946; and this no doubt accounts for what happens to most of the chemical worker's postwar wage rises.

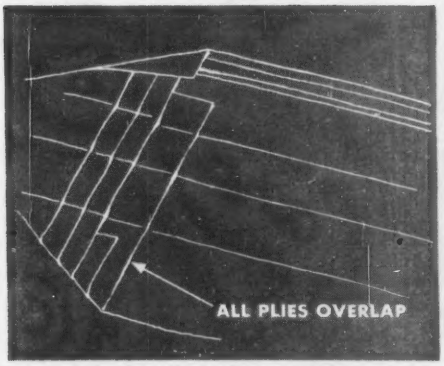
But more than just keeping up with living costs, many hourly paid chemical workers—particularly skilled operators and mechanics—are finding that they're coming out ahead in financial score-keeping. And this is

*As defined by the U. S. Bureau of the Census.

NEW! UNION BAG GIVES YOU AN IMPROVED PACKAGE WITH THE MOST SIFT-PROOF PASTED VALVE MULTIWALL



More functional valve corner for high-speed packers. Built-in reinforcement. Easy to handle. No insert needed.



Stepped plies in bottom construction add strength, end sifting. In the new Union Stepped End Multiwall, *all* plies overlap.

Reinforced stepped end bag adds strength, simplifies handling

Now—finally and completely—you can put an end to the waste, disorder, and customer dissatisfaction caused by excessive sifting and spillage. Union Bag's new sift-proof Stepped End Multiwall gives you better performance, greater strength, and definite packaging-line savings. You get more accurate weights; cleaner plants, cars and warehousing.

EASY PLACING ON VALVE PACKER. This new Union Multiwall saves labor, maintains packers' rhythm and speed. Built-in stiffness at the valve corner speeds the feeding operation.

NO INSERT. The Union Stepped End Multiwall does not require an insert. The valve corner itself has been designed to serve as a natural insert. No catching on the valve spout.

STRONGER BOTTOM CONSTRUCTION. Stepped (or overlapped) bottom and valve construction permits every ply to overlap. The points of greatest pressure receive maximum reinforcement.

IMPROVED VALVE. The top of the valve also has been reinforced to prevent blow out and insure against breakage on the valve spout.

ASK FOR DEMONSTRATION. A Union representative will be glad to show you samples of the new Stepped End Multiwall, along with performance records.

NOW! A TRULY SIFT-PROOF MULTIWALL!

Yes, we would like to hear more. Show us how your new Stepped End Multiwall can make our packaging operation more efficient.

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JACQUES WOLF WETTING AGENTS have thousands of uses in manufacturing processes that require reduction of surface tension, allowing exceptional penetration, saturation, wetting-out and dispersion.

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leading to a new situation in chemical companies' industrial relations.

What do these workers do with income that's left over after paying for food, clothing, shelter, auto and appliances? Quite a few have been investing in U. S. savings bonds; and some of them—perceiving that returns on bonds are relatively low—have turned to common stocks, often the stock of their own employers.

Purchase Plans Offered: Within the past year, four large chemical companies have taken account of this desire on the part of their employees by offering stock purchase or stock option plans via payroll deductions.

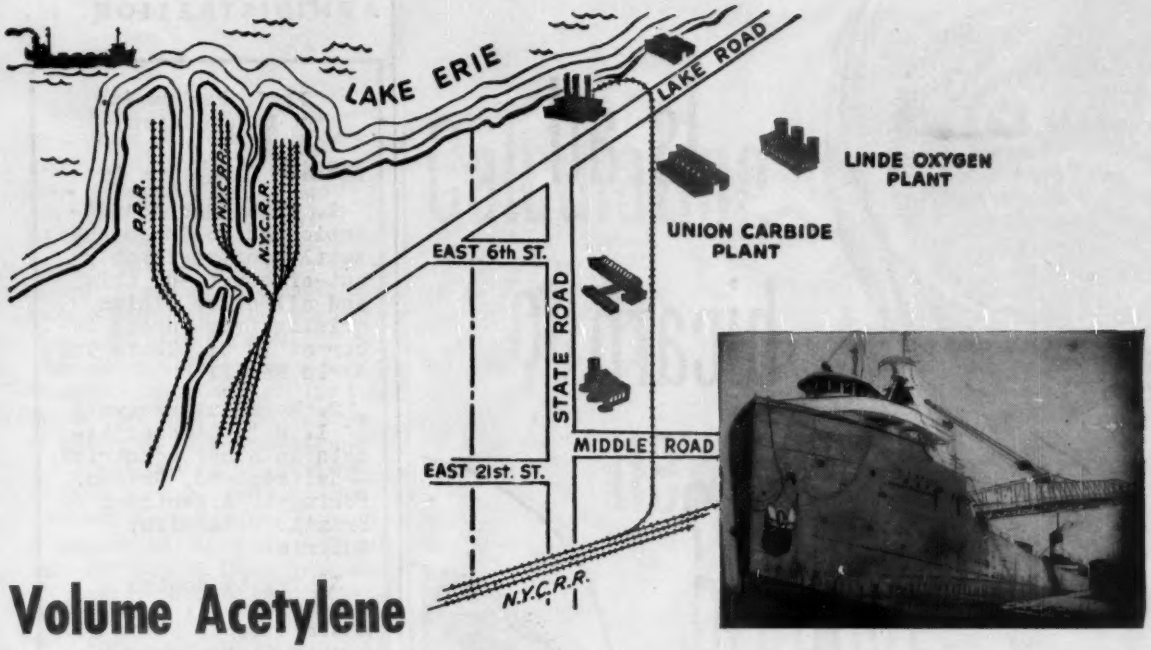
Generally, an employee who is investing regularly and seriously in the company he works for has a different economic viewpoint than the labor union zealots so prominent in the country's work force during the 1930s. And chemical companies—particularly the ones making such high-labor-cost products as synthetic rubber and industrial inorganic chemicals—are finding that their labor relations programs have to be drastically overhauled to click with today's high-paid, stock-owning employees.

In some segments of the chemical industry, the workers' move toward investor capitalism has been extremely rapid. Back in 1947, the auto workers —perennial vanguard of the collective bargaining corps—boasted an average hourly earning that was 4¢ higher than the average for synthetic rubber workers, top earners in the chemical field. Now the synthetic rubber average is 11¢ above the auto figure, and the soap and glycerine average is 7¢ over the current auto average—even though the auto industry's average hourly earnings have risen by 81¢ over the decade.

Throughout this industry, the past 10 years have brought average earnings to more than $2/hour and $85/week, with an ever-increasing number of employees buying stock in their companies. For many companies, this trend will mean a search for new policies on employee and union relations.

The Subject Is Silicones

HIGH RANKING or low ranking makes no difference; every new employee at Union Carbide's new Silicones Division plant at Long Reach, W. Va., attends a class at which Plant Manager R. S. Abrams (*back to camera*) explains how and why the company became interested in silicones, what they're used for and how they're made. A class is convened whenever there are 12 to 15 new employees. Diversity of the newcomers in the group pictured is indicated by their working clothes: three chemical operators, one assistant plant engineer, janitor, crib attendant, telephone operator-receptionist, secretary, and electrical foreman. Also members of this class, but not shown: a nurse, shift operator, and another chemical operator.



Volume Acetylene Now Available at ASHTABULA

If you plan to use acetylene as a raw material in your proposed new plant, consider these advantages of the Ashtabula, Ohio, area:

1. Acetylene by Pipe Line. Acetylene gas can be generated at the UNION CARBIDE plant in Ashtabula and piped directly to you. In fact, acetylene now can be piped safely and economically for many miles.

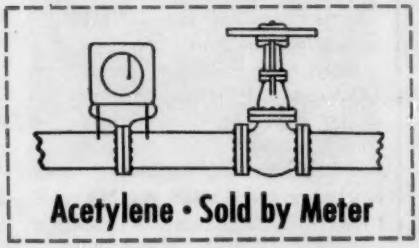
2. Plant Sites Available. Choice locations for your new plant are available in or near Ashtabula, and well within piping distance of volume acetylene.

3. Ashtabula—A New Chemical Center. Chemicals now produced in the Ashtabula area, in addition to acetylene and calcium carbide, include sodium, chlorine, oxygen, HCl, lime slurry, polyvinyl chloride, and trichlorethylene. Nitrogen is also available in large volumes.

4. Transportation—Rail or Water. Ashtabula is served by the New York Central, the Pennsylvania, and the Nickel Plate Railroads. With its location on Lake Erie, your products can be shipped by barge to all parts of the United States reached by inland waterways. Completion of the St. Lawrence Seaway will offer further advantages for bulk shipments.

UNION CARBIDE is also produced at Niagara Falls, New York; Sault Ste. Marie, Michigan; and Portland, Oregon, in addition to Ashtabula. Bulk shipments to chemical users can be made from any of these plants, including Ashtabula. Drum stocks for industrial users are maintained at 111 warehouses throughout the United States.

Whatever your plans or requirements, you are invited to telephone or write to LINDE'S CARBIDE-ACETYLENE DEPARTMENT for complete technical information and counsel.



LINDE AIR PRODUCTS COMPANY

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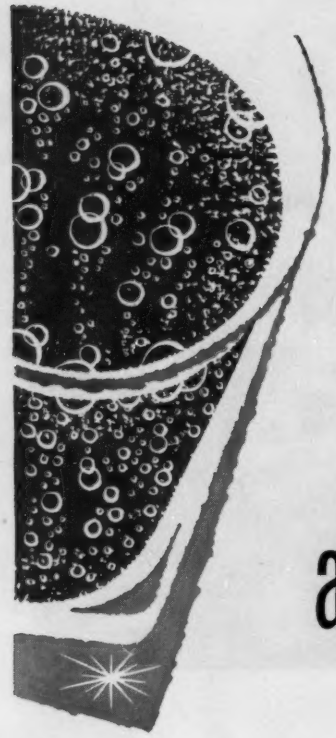

Is all bicarb alike?

Skeptics like to think that all bicarbonate of soda is the same: just plain, everyday old $NaHCO_3$. We don't look at it that way. In fact, we take an intense interest in every particle of sodium bicarbonate we make – and we produce billions of bicarb particles each day. Every batch is manufactured under constant laboratory supervision, careful scientific control. ¶ As a result, particles are always uniform in size, free-flowing, smooth-blending – in every grade from powdered to coarse granular. ¶ This assures users of better products – such as baking powders, self-rising flours, dairy products, beverages, sponge rubber, dentifrices, plastics, leathers, dyes, fire extinguishers, cosmetics, and many other products. ¶ If you'd like samples and data on our wonderfully talented $NaHCO_3$ – or any of our complete line of chemicals – send us full details on your needs. We'll mail to you as much information as possible relating to your requirements. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

Wyandotte CHEMICALS

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OTHER ORGANIC AND INORGANIC CHEMICALS

I. G. Farben-in-Liquidation

MEMO: Things to do

1. Press for adjudication of Wollheim case; settlement–preferably out-of-court—of this and all other claims arising from forced labor at I. G. plants in World War II.

2. Work out recovery of I. G.'s blocked assets in other countries —Switzerland, Sweden, Portugal, Argentina, Brazil, S. Africa, Austria.

3. Try to scotch rumors that I. G. still has claims to Swiss accounts that might be connected with Interhandel.

No Hope for Speed

Nettled by a rash of rumors about disposition of stock in the Huels chemical concern, West Germany's I. G. Farben-in-Liquidation asserts this week that the status of its Huels holdings can't be cleared up until there's a decision on I. G.'s appeal of the Wollheim forced-labor suit.

And that won't be before late next year, it appears from all the technicalities in which the matter is enmeshed. In trial court, Norbert Wollheim—now a U.S. citizen—won an award for $2,500 as compensation for 20 months' forced labor at an I.G. plant during World War II. Some 2,400 other persons have announced similar claims, and more are likely if Wollheim wins the test case. I.G.—noting that the forced-labor program was dictated by the Nazi government —is hoping it'll be absolved of legal responsibility, but says it would be willing to settle out of court.

Only after such settlement, says I.G., can distribution of some $24 million worth of Huels securities be considered. Other complications: restrictions hindering recovery of I.G.'s blocked or seized assets in other countries.

LEGAL

Infringing Inducements: When does infringement of a use patent begin? According to a special master's report made to Judge Gregory Noonan in a federal court lawsuit at New York, it starts as soon as active measures are taken to persuade someone to use a process or product. The point was made in reference to a suit brought by Deering, Milliken & Co., against the Temp-Resisto Corp. and Samuel Kaplan & Sons, Inc. (New York). Deering, Milliken, holder of patents on the use of Milium—a metal-impregnated lining material used for its lightness and insulating qualities—seeks an injunction and damages arising from infringement of its patent. Special Master William H. Davis, in making his report to the court, said, "There is abundant evidence that defendants have actively engaged in persuading garment manufacturers to incorporate Temp-Resisto in their garments. In my opinion this constitutes active inducement and, therefore, infringement."

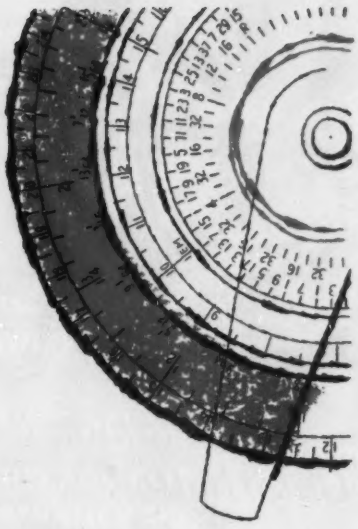
•

Invention Confirmed: A court test has strengthened Minnesota Mining & Manufacturing Co.'s (St. Paul, Minn.) claim to an invention that may prove to be the basis for an important process patent. In Wilmington, Del., last fortnight, U. S. District Court Judge Richard Rodney ruled that 3-M and Philip Palmquist, an employee, are the sole inventors of a method of surface decorating "readily extensible" plas-

WIDE WORLD

JUDGE NOONAN: Will ruling be injunction and damages?

Calculating on a new product?



call on us

The starting place of a new product is frequently in the precipitate at the bottom of a test tube—or in the lines of a spectrograph. On the other hand, product development in reverse – that is, exhaustive analysis of what goes into a product – often presents new clues to improvement by slight changes in chemical structure. ¶ Here at Wyandotte, we're equipped to do both: develop new products; improve old ones through the addition or substitution of research-developed chemical ingredients. ¶ If you've a new product in the works – or if you're revamping an old one – remember, our chemical know-how is on tap for you at all times. For technical assistance, outline your needs in as much detail as possible, and send your outline along to us. We'll forward as much pertinent data as we have (and we have quite a bit). *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

Wyandotte CHEMICALS

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Diamond's Chlorinated Solvents get here on time!

Prompt shipments? That's what DIAMOND offers on METHYLENE CHLORIDE (Dichloromethane) orders. Underwriters' rates it nonflammable under ordinary heat. Use it, up to 60 C., in the presence of air, water and light.

DIAMOND'S METHYL CHLORIDE (Chloromethane) resists oxidation up to 200 C. Fine thermal stability. Little decomposition below 400 C. in the absence of air and water. Comes in tank cars only as liquefied gas under pressure.

Get technical grade CHLOROFORM from DIAMOND, too. In tank cars, drums or cans. U.S.P. grade in drums or cans. Use both with common construction materials up to 120 C.

DIAMOND makes technical grade CARBON TETRACHLORIDE, fire extinguishing fluids and grain fumigants, and also custom blends of chlorinated solvents for special applications. Order in drums or tank cars.

Another DIAMOND solvent—PERCHLORETHYLENE—is outstanding for metal degreasing as well as dry cleaning. Its pleasant, unique odor and ease of recovery help make it popular.

Put DIAMOND's chlorinated solvents line-up to work for you. Simply phone your nearby DIAMOND sales representative. Or write DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.

CHEMICAL PROGRESS WEEK-APRIL 23-28

DIAMOND CHEMICALS

Diamond Chemicals

ADMINISTRATION . . . . . .

tics. 3-M brought suits, tried together, against two firms, Plastic Film Corp. and Chavannes Industrial Synthetics, Inc. (both of Delaware), asking that a patent be issued to 3-M and not to the defendant firms.

•

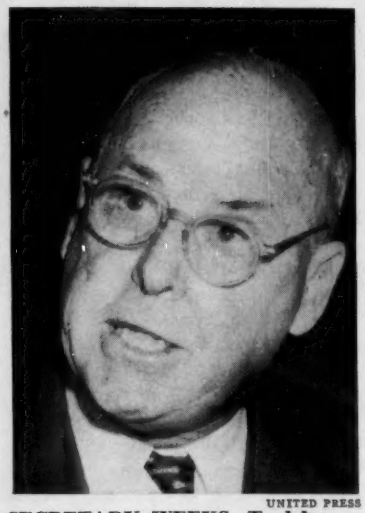
Price Discrimination: A chemical company providing services connected with its products can be caught in price discrimination charges. This was brought out recently in a cease-and-desist order arising from a consent decree between the Federal Trade Commission and Elmo, Inc., a maker of cosmetics and toilet preparations. The order prohibits Elmo from offering any allowances for promotional service or materials unless equal considerations are made available on proportionally equal terms to all of its customers who compete in the resale of Elmo's products. In addition, it prohibits Elmo from furnishing any demonstrator services to any customers unless similar services are offered to all other customers in the same trading area.

LABOR . . . . . .

Chain Reaction: Sweeping impact of job classification changes on total labor costs is seen in new wage schedules going into effect this week at plants of Aluminum Co. of America. Increases of from 7¢ to 30¢ in hourly pay rates—retroactive to last Aug. 1—are being put on payroll records for some 11,000 employees represented by United Steelworkers (AFL-CIO). These increases are based on job classification changes agreed on last week, which in turn were patterned after job classification definitions negotiated by that union in the steel industry several years ago. The new increases will add about $1.5 million to Alcoa's annual wage bill and bring basic wage rates up to a $1.74½ minimum and a $2.90½/hour top.

•

Asks Moderation: In discussing general business conditions—he calls them "good"—last fortnight, Secretary of Commerce Sinclair Weeks went out of his way to urge both management and labor to "do everything they can to help hold the line against inflation." Both groups, he says, should "watch their pricing policies and not try to get all the traffic will bear"; and labor unions ought to be "as much interested in what the dollar will buy as in how many dollars they get."



UNITED PRESS

SECRETARY WEEKS: To labor, a warning—'start using restraint.'

•

Right-to-Work: Besides being at issue in a case before the U.S. Supreme Court, state "right to work" laws are up for popular or legislative approval in more than half of the 48 states. This is the word from former Rep. Fred Hartley, Jr., president of the National Right to Work Committee, who figures that attempts to ban compulsory union membership are good bets in at least 15 states; and that in at least 12 of the 18 states that already have such laws, labor unions will be striving for repeal.

•

Three Strikes Start: Within a week's time, strikes started up at three chemical process plants, one on each U.S. coastline. At Anacortes, Wash., the Oil, Chemical & Atomic Workers (AFL-CIO) struck the new $75-million Shell Oil refinery, demanding wage increases of from 30¢ to 54¢/hour. Another OCAW local went on strike at the Ethyl Corp. plant near Houston, Tex., also asking a 30¢ wage boost. And at Wilmington, Del., the United Rubber Workers (AFL-CIO) walked out at the Delaware Floor Products Division plant of Congoleum Nairn Corp. in protest over two grievances.

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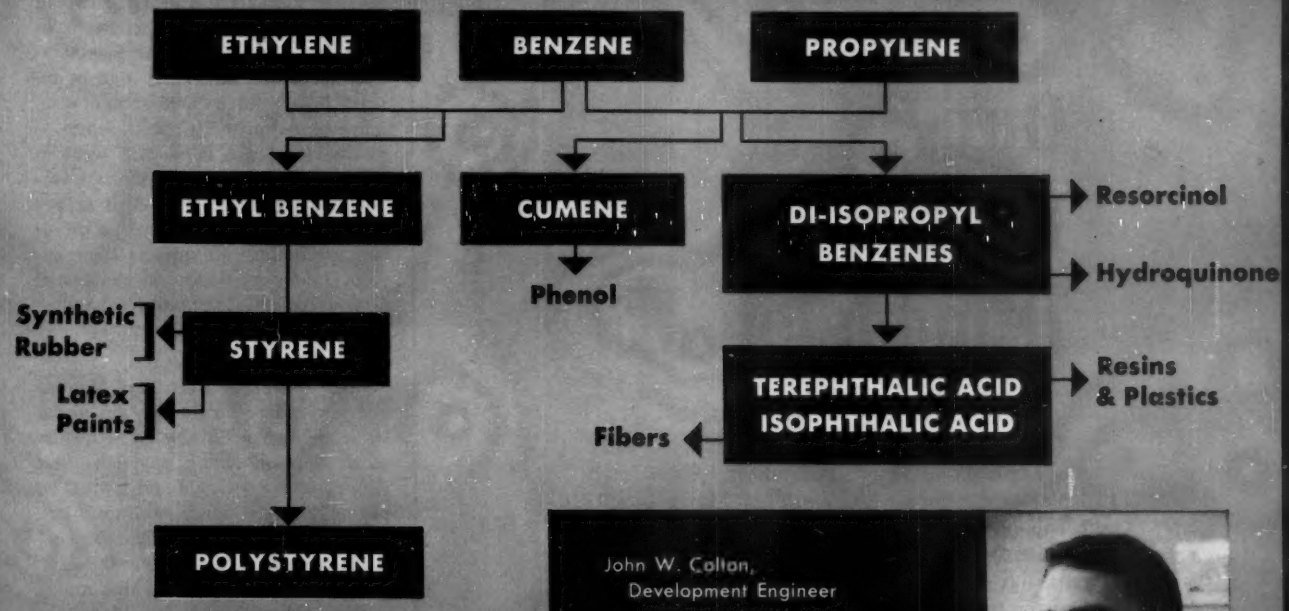
Two Cut Adrift: Fighting for legality in the face of the government's crackdown on allegedly leftist labor unions (*CW, March 10, p. 34*), the

PROCESS FLEXIBILITY



John W. Collan,
Development Engineer

"The ready adaptability of an SD alkylation plant to a variety of products is the best kind of security against changing market demands and plant obsolescence."

SD Alkylation Processes are Key to Flexibility and Diversification

A quick look at the above diagram shows the flexibility of SD's versatile alkylation processes. Utilizing Friedel Crafts catalysts, such as aluminum chloride, SD's alkylation system produces a variety of substituted aromatics needed for synthesis of a wide range of important chemicals.

The SD-engineered cumene plant of the Barrett Division of Allied Chemical & Dye Corporation, at Frankford, Pa., is one example. By means of its own process Allied converts the cumene into phenol of very high purity.

A unique feature of SD's alkylation technique is its ready adaptability, with minor modifications, to the production of either cumene or ethyl benzene (used in the manufacture of styrene). This is particularly important because of the expanding markets for synthetic rubber and the continuing growth of styrene-butadiene latices in the paint field.

Synthesis of styrene, by catalytic dehydrogenation of ethyl benzene, is also encompassed in designs executed by SD. This synthesis may be integrated with the alkylation unit into a single plant.

And now SD's process design for suspension polymerization of polyvinyl chloride, based on which plants are now under construction for The Borden Company, Eleonora Chemical Corp. and Thompson Chemical Company, has been adapted to production of both polystyrene and PVC in common facilities.

Again with certain modifications in the cumene plant, di-isopropyl benzenes may be produced, separately or simultaneously with cumene. The meta and para isomers may be used, in a variant of the hydro-peroxidation process, to produce resorcinol and hydroquinone, respectively. As an alternate, terephthalic acid and isophthalic acids can be produced from the di-isopropyl benzenes by oxidation techniques developed by SD and associated companies. These acids are currently in great demand for synthetic fibers and a new family of plastics and resins.

In new plant construction or the revamping of existing facilities to increase production efficiencies, SD's services are available on a confidential basis. Whether the project requires development of a new process, acquiring an existing process or engineering one of your own, you will profit by SD's specialized experience in organic chemical plant design.

SCIENTIFIC DESIGN COMPANY, INC.
Executive Offices:
Two Park Avenue
New York 16, New York
Engineering Offices:
Jersey City, New Jersey

SD 123

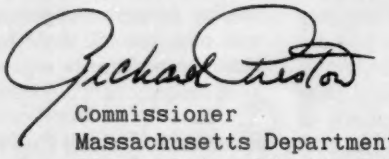
Our Fourth Dimension . . .

The other day a fact-finder dropped into our office to get some information for a client planning to locate an industry in Massachusetts. Talk got around to availability of highly trained professional people — engineers and the like. Our pool of top-level workers is one of the finest in the country, but reluctantly we had to admit that you don't find too many such folks at liberty.

At that point, our visitor made the interesting observation that his client did not consider this to be a major location problem. He went on to explain that in their experience, engineers, technicians and other high-salaried workers in industry throughout the country are eager to come to New England because it is so fine a region in which to live and work and raise a family.

This *livability* is Massachusetts' fourth dimension in the field of economic development. And there is truly gracious living in this old Commonwealth of ours, rich in its incomparable heritage of American history and culture — its superior educational facilities, its delightful variety as a vacationland, its warm homeliness.

We commend this important element of *livability* in Massachusetts to industrialists with plant location problems.



Commissioner
Massachusetts Department of Commerce
334 Boylston Street, Boston 16
(COpley 7-5600)

ADMINISTRATION. . .

International Union of Mine, Mill & Smelter Workers has dropped two of its most controversial leaders from their union posts. Former Secretary-Treasurer Maurice Travis is to be retired July 1 on a $300/month disability pension, and Clinton Jencks—ex-president of a Mine-Mill local in New Mexico—will receive his severance pay June 1. Mine-Mill is not deserting these men, however; it promises to continue to support their appeals (from conviction on charges of filing false non-Communist affidavits) "even to the Supreme Court."

•

Strike Damage Recovery: If your company has been hurt by an illegal strike, you may be able to settle the score by withholding payments that your company would otherwise be paying into the union welfare fund. That's exactly what a Tennessee coal mining company did, and a U.S. district court jury has okayed that move. This is believed to be the first case of its kind, and the union is considering an appeal to the circuit court.

KEY CHANGES. . .

Albert E. Forster, to board chairman, Hercules Powder Co. (Wilmington, Del.).

Sir William Thomas, to board chairman, Monsanto Chemicals, Ltd. (London, England).

John S. Battle, to director, Virginia-Carolina Chemical Corp. (Richmond, Va.).

L. W. Cameron, to president, **Roger W. Cohill,** to vice-president, and **W. D. Ashmore,** to treasurer, Miller Chemical & Fertilizer Corp. (Baltimore).

Henry K. Norton, to board chairman, Walter Kidde Nuclear Laboratories, Inc. (Garden City, L. I.).

David Ketner, to vice-president, International Latex Corp. (New York).

James M. Veeder and **John E. Spears,** to vice-presidents, Koppers, Inc. (Pittsburgh).

D. H. Putney, to president, Stratford Engineering Corp. (Kansas City, Mo.).

Harry C. Burger, to vice-president, Gates Engineering Co. (Wilmington, Del.).

POLYCO® 684

Dextrine Compatible

new!

from Borden

... the polyvinyl acetate emulsion experts

If you have been looking for a polyvinyl acetate emulsion that can be compounded with dextrines for remoistenable adhesives and similar applications . . . new POLYCO 684 is your answer.

Tests prove that Dextrine-POLYCO 684 combinations in all proportions, and up to 70% total solids, are readily prepared simply by stirring dry dextrine into POLYCO 684 and heating to 80°C.

While developed primarily as a base for compounding envelope adhesives, the high degree of compatibility and ease of handling make new POLYCO 684 ideal for a wide variety of additional applications such as decalcomanias, carton seals, label glues, textile sizes, paper coatings. Ideal, in fact, for any application requiring a combination of the film-forming, oil-resistant, adhesive qualities of polyvinyl acetates . . . plus the economy and low cost of dextrines and starches.

For working samples and further information, please contact us at the address below. If you wish, one of our experienced Polyco Technical Service Representatives will call at your plant.

Borden is also your headquarters for:

- All types of Vinyl Acetate Homo-and-Copolymer Emulsions
- Polyvinyl Acetate Solutions
- Polyvinyl Alcohols
- Sodium and Potassium Polyacrylates
- Butadiene-Styrene Latices

POLYCO-MONOMER DEPARTMENT

THE *Borden* COMPANY

CHEMICAL DIVISION

350 MADISON AVE., NEW YORK 17, N. Y.

for greater ease, economy, safety- **Baker REAGENT ACIDS *in the* 6½ GALLON CARBOY!**

The Baker 6½-gallon carboy was developed and introduced for Baker customers who prefer a smaller, lighter carboy than the 13-gallon size. They asked for: labor-saving, one-man handling — greater safety — added protection of purity — more economical storage — lower freight cost.

For your easy review, the plus-values of the Baker 6½-gallon carboy are detailed below. You'll find they contribute to increased operating efficiencies:

EASIER HANDLING — One-man pouring and stacking. Sideposts are short — containers can be brought close to the lip of the carboy.

MORE EFFICIENT STORAGE — Flat top for easier stacking — lower space requirements per pound of acid. (The 6½-gallon carboy occupies 2.85 cubic feet *versus* 7.62 for the 13-gallon carboy. 50% more acid can be stored or shipped in same amount of space.)

LOWER FREIGHT COST — Estimated as 25-35% lower for LCL or LTL shipment, and comparable for carloads or truckloads.

GREATER SAFETY AND PROTECTION OF PURITY — The 6½-gallon bottle is stronger. It can be emptied easily and safely by pouring or siphoning. Special lip construction permits cleaner pouring. Screw cap covers pouring lip — caps are interchangeable. Poly-ethylene cap-liners provide complete sealing. The carboy box top is flat, covers completely, and is easily removable for pouring and inspection.

Whichever carboy you specify — the 6½-gallon or 13-gallon size — Baker high-purity Reagent Acids will continue to be your best buy!

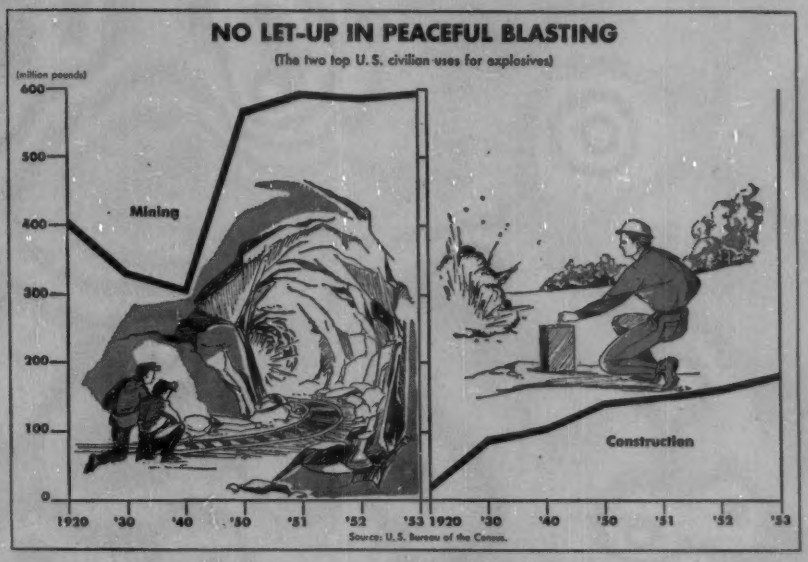
J. T. Baker Chemical Co.

REAGENT · CHEMICALS · FINE · INDUSTRIAL

Phillipsburg, New Jersey

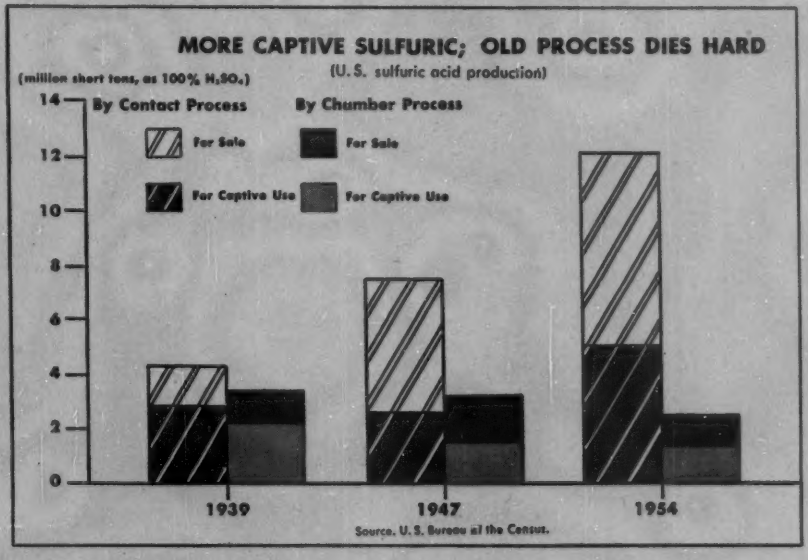
Charting Business

CHEMICAL WEEK
April 14, 1956



EXPLOSIVES—once the foundation of the U.S. chemical industry—are still a major item in chemical companies' sales figures; but peaceful and constructive applications now far exceed the munitions end of the business in commercial importance.

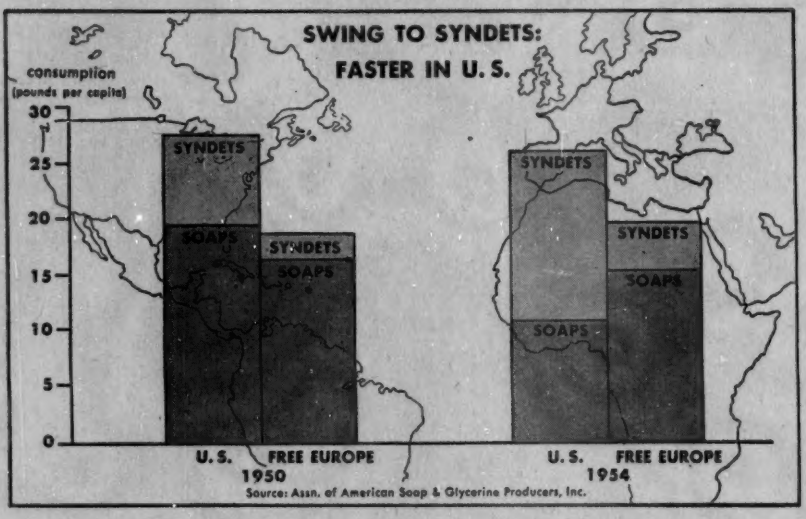
Outstanding feature of the explosives business in recent years: the increasing importance of construction companies as users of explosives. Of U.S. industrial explosives production, the proportion used in construction work rose from 19.4% in 1950 to 25.3% in '54.



SULFURIC ACID production in the U.S. has more than doubled in the past 20 years, with the old chamber process still hanging on in many plants. The more efficient contact process accounted for ony 23.2% of total output back in 1919 but for 83.0% during 1954. Between 1947 and 1954, the number of plants in which sulfuric was the principal product increased from 43 to 47; employment rose from 3,100 to 3,900; annual payroll went up 87% to $17.2 million; and productivity (as value added per man-hour) rose 80.6% to $10.61.

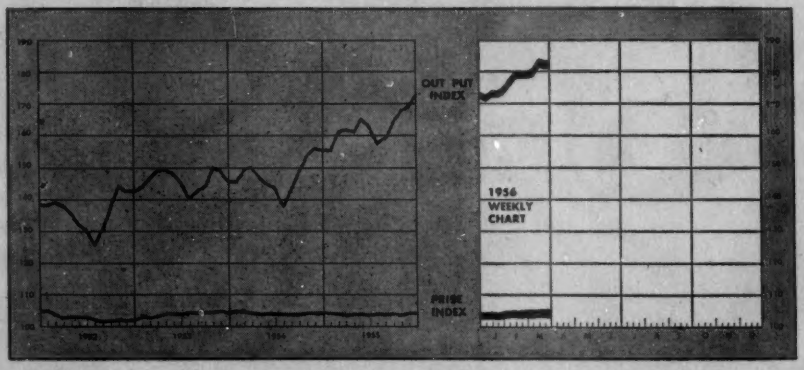
Charting Business

(Continued)



WHILE per capita consumption of soaps and synthetic detergents has held fairly steady in the U.S. for the past 30 years or more, western European countries are just beginning to catch up on this usage. And while syndets have taken over more than half the market for these products in the U.S., people in Europe still rely largely on soap. Among western European countries, per capita syndet consumption ranges from a low of 0.1 lb./year in Italy to a high of 3.8 lbs. in Germany. Average consumption of both kinds of cleaners was 11.3 lbs. in Italy, 28.7 in Belgium. In the U.S., average usage has climbed by about 50% over the past 50 years, reaching a high of 27.7 lbs./year in 1950.

BUSINESS INDICATORS



WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	183.5	183.2	161.8
Chemical Week Wholesale Price Index (1947=100)	105.7	105.7	104.1
Stock price Index of 11 Chemical Companies (Standard & Poor's Corp.)	515.0	500.0	373.6

MONTHLY—Wholesale Prices (Index 1947-1949=100)	Latest Month	Preceding Month	Year Ago
All Commodities (other than Farm and Foods)	121.0	120.6	115.6
Chemicals and Allied Products	106.5	106.4	106.8
Industrial Chemicals	120.0	119.9	117.5

LEADERS of the American paint industry, like those represented above, supply a constantly increasing amount of *alkyd resin* paints for industry and home. These paints grow in popularity each year because they provide unusual durability, color retention, and adhesion—as well as easy brushing and fast drying.

Dependable supplies of uniform quality phthalic anhydride play an important part in alkyd resin paint production. That's why Pittsburgh Coke & Chemical is a key supplier for so many paint manufacturers.

As a *basic* producer, Pittsburgh can assure them (1) Reliable supplies from an integrated plant and (2) Assured purity, low color value and low maleic anhydride content, thanks to Pittsburgh quality control from coal to finished phthalic anhydride. Let us show you how you may be able to benefit from these advantages, too!

WSW 5731 B

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

WIDE WORLD

LAST STEP: Home kits made permanent waves commonplace, but beauty shops are still making them easy.

They're Going Back to the Salon Again

Coexistence is the watchword in permanent waves today: home kits and salons find they can prosper together.

Monoethanolamine lotions, bromate neutralizers are among innovations keeping professional wave kit sales climbing. Last year's $15-20 million marks a 10-fold rise in 10 years.

WHEN Toni hit the market with its home permanent kits in 1944, something much like panic ran through the sprawling beauty shop business. To an industry already on shaky ground, it seemed to be the kiss of death. Now, over 10 years later, the home permanent has proved to be more like the kiss of Prince Charming who awakened the sleeping beauty.

The home permanent found an easily exploited market. One beauty shop supplier recalls: "After World War II, the beauty shops were asking for trouble. There weren't enough operators to give good service, and prices were way out of line. Now that they've been brought to their senses, they're getting business back."

Actually, the professional permanent wave preparation has been gaining steadily (whereas the home wave market leveled off in 1953 and 1954). Ten years ago, professional wave sales were $2.8-3 million (wholesale); five years ago, they were $17-18 million; last year, $28-30 million (wholesale) or $15-20 million (manufacturers').

Odorless Bandwagon: One way they are getting business back is through new technology, which, as in the auto industry, means bringing up a new product every year.* This year, for example, Raymond Laboratories, Inc. (St. Paul, Minn.) introduced a non-ammonium thioglycolate-type wave, with odorless monoethanolamine as its active agent. This puts into motion a bandwagon that a good many of the others are expected to climb onto (although many still say that proper perfumes are the best answer to the odor problem).

Big Eight: It is estimated that 75% of the professional cold wave business is done by eight firms, each of which has a sales volume of $2-4-million annually, all of which do their own manufacturing.

The eight: Helene Curtis Industries, Inc. (Chicago); Raymond; Sales Affiliates (division of Evans Chemetics, Inc., New York); Realistic Co. (Cincinnati, O.); Caryl Richards, Inc. (Brooklyn, N.Y.); Samuel Bonat & Bro., Inc. (Patterson, N.J.); Rilling Dermetics Co. (Bridgeport, Conn.); and Heatless Permanent Wave Co. (San Francisco, Calif.). The top three, in order, are Curtis, Raymond (Raymond claims first place, but most put Curtis first) and Sales Affiliates. Indicative, if not typical, of the way these firms have prospered is in the latest report of the Realistic Co.: A 1,000% increase in business over the past 10 years.

Their prosperity represents a growth

*But, unlike the auto industry, cold wave makers don't discard old models. Most have 13-14 different waves in their catalogs, each with a tradename (So-Natural, Tite Curl, Flexawave). The companies often claim to be able to offer almost prescription-type products, tailormade for every hair problem.

Now! Stronger and tougher paint films!
—with National's new Resyn® 12K-55

RESYN 12K-55 is new. But the copolymer is unchanged. It's the same inherently flexible Resyn 12K that's gained wide recognition among paint makers. The improvement is in the balanced emulsifier system. Particles are smaller. Flow together more readily. Form stronger, tougher films.

RESYN 12K-55 offers still further advantages:

- Uniform color over surfaces of varying porosity
- Improved compatibility with tube color systems
- Excellent color development
- Easy brushing and leveling properties
- Improved stain removal characteristics
- Simpler formulation
- Freeze-thaw stability
- Low temperature film formation
- Borax compatibility
- Lower viscosity
- Prolonged aging stability
- Low residual monomer content

RESYN 12K-55 can be used as a base for interior—and exterior—vinyl paints and primers. Let one of National's Vinyl Specialists explain Resyn 12K-55 more fully. Just write or call your nearest National office.

RESIN DIVISION

National

STARCH PRODUCTS INC.

National Starch Products Inc., 270 Madison Avenue, New York 16, N. Y. • Plainfield, N. J. • Chicago • Los Angeles • San Francisco • Cleveland • St. Louis • Atlanta • Canada: Toronto • Montreal • Vancouver • Mexico City: Polimeros, S. A., Apartado 28504, Mexico 17, D. F.

of the permanent wave business as a whole. Home kit makers expect sales of $100 million this year (compared with an estimated $50 million in '51). With cheap home kits available, an increasingly large proportion of American women have been favoring curls; now, nearly all women wear them. It's natural, in the present period of high incomes, frozen dinners and push-button laundering, that a lot of these women want to get their permanents effortlessly, in the salon.

It is the ease and the professionalism of the shop that has brought the women in—not a dissatisfaction with home products. In fact, the product a woman demands when she goes to a salon is little different from the cold wave she uses at home. Cold waves now account for about 90% of the professional business, whereas in 1947 they had only about 40%.

$1,000 Wave: The permanent wave celebrated its 50th anniversary last year. Since 1905, when operators of London inventor Charles Nestle's new machine took 18 hours and charged $1,000 to give a wave (and beauty shop operators were certain a "permanent" wave would drive them all out of business), the industry has gone through several phases.

The machine wave (using alkaline solutions, such as sodium carbonate) is now a thing of the past and the machineless hot wave (based on heat-generating chemicals like calcium oxide) is on its way out.

The cold wave was introduced in beauty shops just before the war. Just whose idea it was is a question the courts are still trying to decide. Sales Affiliates is awaiting a high court decision on its patent suit (the McDonough patent, U.S. Pat. 2,577,710) against Toni, Helene Curtis and others.

Curly or Bald: Ammonium thioglycolate is the basis of almost all cold wave preparations, and Evans Chemetics makes most U.S. ammonium thioglycolate (there are also two small producers: Halby Co., Wilmington, Del., and Summit Chemical Co., Belleville, N.J.). Curtis and Raymond have captive production. The 5-10% of ammonium thioglycolate not used by cold wave makers is used in depilatory manufacture—the substance destroys hair at a pH higher than 11, an effect cold wave makers must guard against.

Story begins on p. 44

Although it works well, thioglycolate has several disadvantages: it is only moderately stable (exposure to air must be kept to a minimum during manufacture, it must be packaged in air-tight containers) and it has a mild sulfidic odor.

Good but Irritative: Regarded as thioglycolate's successor is thioglycerine, which is more stable, less odorous, and possesses greater waving power. So far, however, its use has been blocked by high cost and a tendency to be somewhat more irritative.

The thioglycolate works by breaking cross-links in hair's long protein molecules. The hair is then mechanically curled and rejoined in the new position when a neutralizer removes the glycolate effect. For the past couple of years, the neutralizer has most often been a bromate (Raymond is now building a sodium bromate plant), the so-called "instant" neutralizer that stirred the industry in 1954 (pushed by its "squeeze out of a tube" application).

Package Deal: The neutralizer and lotion are customarily packed in kits (good for one wave) because the lotion's instability requires air-tight storage. These are sold to shop operators at prices ranging from 40¢ to $1.50 apiece. They are distributed by about 1,000 beauty supply dealers, of which 300 are big, and about half of these handle the products of the "Big Eight."

The prices of the kits represent about 10% of the price the woman pays for her wave, the rest being labor. One of the current big problems is training the operators to do a good job—manufacturers' emphasis on the simplicity of their formulas has led to under-professionalism in many cases. At the same time, wave makers are building a little more professionalism into their products. One innovation, which will probably spread, is embodied in Heatless's Water Wrap. The lotion is sprayed into the wound hair from inside the curler, giving an even wave (time of contact for all the hair is the same).

New ideas like this will help the professional-preparation makers stay far enough ahead of the home kits to justify their big price tag. Aside from the competition from amateurs, however, they would appear to have little to worry them. Nobody has any serious doubt that women like curls.

CHEMICAL MARKET: THE BEAUTY SHOP

According to the latest available figures* there are in the U.S. more beauty shops (77,088) than drug stores (55,903), but fewer than there were 10 years earlier (87,270). Typically, each shop:

- Has 2 or 3 operators, including the owner.
- Has, in each 8-hour day, 12-16 patrons/operator.
- Gives 5-7 permanent waves/week (an average: some shops are heavy on hair cuts; others, heavy on permanents, give about 30/week).
- Charges about $8/wave (in cities, up to $15).
- Sells 15-20 hair sets for each permanent.
- Switches among brands of permanent waves (carrying 2 or 3 brands at a time), but concentrates on 1.
- Takes between 1 and 1½ hours to give each permanent (several years ago a wave took 3 hours because hair was longer, each head required 30-36 curlers instead of 18-20 today).
- Buys 24 permanent wave kits at a time.
- Has customers who come back every 4-4½ months for a new permanent (when hair was longer they put it off to 6 months; probably now they should come back every 3 months).

*U.S. Dept. of Commerce, 1948. New census figures will be out this summer. At least one close observer expects a figure between 85,000 and 90,000, for the total number of beauty salons.

From soap to nuts through a new intermediate—**aero*** Glycolonitrile

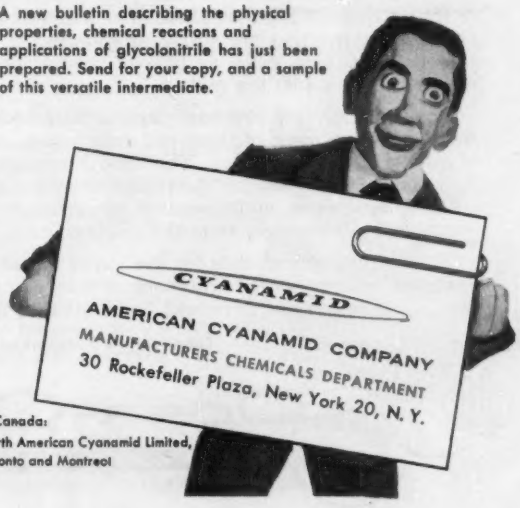
Making surface active agents or brightening nickel-plated nuts is all in a day's work for AERO Glycolonitrile.

N-substituted sarcosinates made from glycolonitrile are gaining importance as surfactants. Lauroylsarcosine provides antienzyme action in toothpaste, makes an excellent shampoo base, provides dispersion and wetting in aerosol formulations. Stearoylsarcosine shows great promise for shaving cream formulations and synthetic bar soaps. Another derivative, glycine, may be used as a component of dentifrices and as a pharmaceutical intermediate.

Glycolonitrile reacts with ethylenediamine to produce ethylenediamine tetra-acetic acid (EDTA), the salts of which are excellent sequestering and metal complexing agents. Glycolonitrile can be used to modify vinyl monomers, such as preparing cyano methyl esters of the acrylic monomers. Glycinamide, prepared from glycolonitrile, can be condensed with formaldehyde to make a thermosetting resin useful in laminates. It may also be trimerized to pyrimidine, which has properties useful as an epoxy resin curing agent. Glycolonitrile itself is an organic cyanide brightener in the electro-deposition of nickel, and a direct source of cyanide.

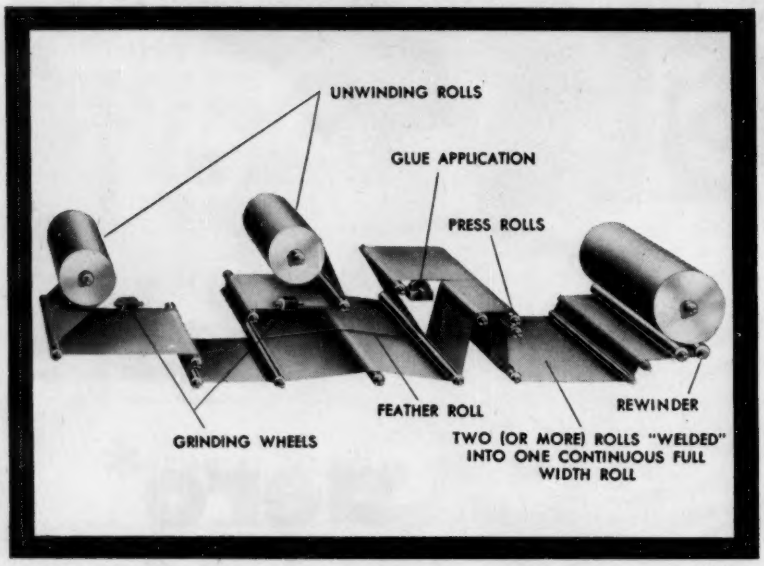
*Trademark

A new bulletin describing the physical properties, chemical reactions and applications of glycolonitrile has just been prepared. Send for your copy, and a sample of this versatile intermediate.



In Canada:
North American Cyanamid Limited,
Toronto and Montreal

MAKING "ENDS" MEET



When paper is sold in widths other than standard machine trim, narrow end rolls are left over. The manufacturer can either store these rolls in valuable warehouse space in anticipation of future sale or return them to repulping machine for remaking into paper. Both of these alternatives are costly procedures. If the unsalable end rolls amount to as much as 10% of production, a 100 ton mill in reality becomes a 90 ton mill.

Now, the Oliver Webwelder paper splicer makes "ends" meet by welding two or more of these end rolls into a single full-width roll of salable size and quality. This unique operation is accomplished by grinders which reduce the thickness of the matching edges, an adhesive applicator, and a series of compression rolls. The resulting seam, which is stronger than the original stock, is barely visible.

The welding of end rolls for the paper industry may be only of academic interest to you. However, it does point out Dorr-Oliver's continuing search for improved techniques in the fields we serve.

Webwelder is a trademark of Dorr-Oliver Incorporated

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Duncan Jones, M. D.
1216 W. 34th St.
New York 16, N. Y.

℞ 2½% Hydrocortisone

Non-prescription Advantages

- Price per tube could be reduced greatly
- Red tape connected with obtaining prescription would be eliminated
- More people would benefit from use of the ointment on minor irritations
- FDA believes adequate labels – full directions, warnings–permit safe use

Telephone Number

Cortisone: Is Over-the-Counter On the Way Out?

MAY 23* HAS BEEN SET as the date for the Food & Drug Administration hearing on over-the-counter sales for hydrocortisone preparations. It was FDA's hope to release the products for nonprescription sales—as outlined last January in the *Federal Register*—but the proposal has since met with considerable opposition, and that's what the meeting next month is to bring into the open.

FDA originally planned to release ointments and lotions containing up to 2½% hydrocortisone or hydrocortisone acetate (in combination with other nonrestricted drugs, or alone).

But now, with some dermatologists protesting that the products are not safe for the layman to use, and with firms like Pitman-Moore suggesting that use of hydrocortisone with an antibiotic (a widely used idea to reduce danger of infection) is an inconsistency, FDA will examine the

*10 a.m., May 23, 1956, Room 5051, Health, Education & Welfare Building (4th and Independence Ave., S. W.), Washington, D.C. Leonard Hardy will preside.

Reg. No. XXXII
hours 2-6 p. m.

Ointment

Prescription Advantages

- Ointment will be used only where doctor recommends it.
- Chances of over-use will be reduced
- Less chance ointment will be used where infection could be spread
- Few people accurately follow label directions

MURRAY HILL 9-2121

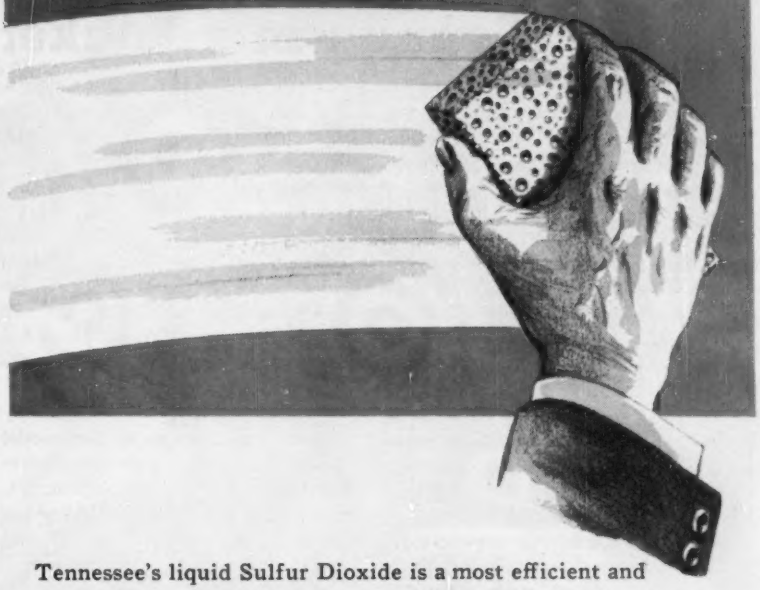
question from three angles:

- Are preparations with not more than 2½% of the hydrocortisone or its acetate safe for nonprescription use when applied not more than twice daily for not more than five days?
- Are these preparations safe for use without prescription under any other conditions and labeling?
- Is a warning against use of these lotions and ointments in presence of infection necessary for safety when the cortisone form is combined with oxytetracycline hydrochloride or neomycin sulfate?

So far, FDA hasn't learned whether all 12 potential makers† of the preparations will appear at its hearing. But several dermatologists have indicated interest, and it seems likely that some of the basic manufacturers of the cortisone will take part. In any case, as the chart (*above*) shows, a number of points must be considered, and FDA will have a tough decision to make.

†Under the January directive, 12 firms prepared to market cortisone preparations: Bard Pharmaceuticals, Inc. (Yonkers, N.Y.); Bryant Pharmaceutical Corp. (New York); Ciba Pharmaceuticals Products, Inc. (Summit, N.J.); Gray Pharmaceutical Co. (Newton, Mass.); Laboratories for Pharmaceutical Development, Inc. (Yonkers, N.Y.); Lafayette Pharmacal, Inc. (Lafayette, Ind.); Chas. Pfizer (Brooklyn); Premo Pharmaceutical Labs, Inc. (Hackensack, N.J.); Sharp & Dohme (West Point, Pa.); Success Chemical Co., Inc. (Brooklyn); Upjohn Co. (Kalamazoo, Mich.); Whitehall Pharmacal Co. (New York).

TENNESSEE'S LIQUID
SULFUR DIOXIDE
HIGHEST QUALITY
SO_2
for Effective Removal of
Residual Chlorine!



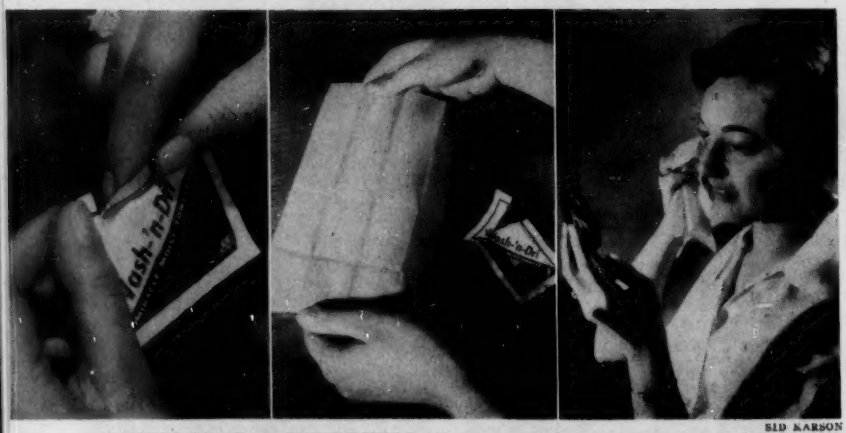
Tennessee's liquid Sulfur Dioxide is a most efficient and economical antichlor. Removes residual chlorine and other materials which cause color reversion or yellowing with age. It also eliminates excessive residual chlorine in water.

Tennessee's Liquid Sulfur Dioxide practically 100% pure, is also very effective as a reducing, bleaching and neutralizing agent, perservative and pH control.

We would like to consult with you on the possibilities of Tennessee's Liquid Sulfur Dioxide in your processing.

Available In:
• CYLINDERS • TON DRUMS
• TANK TRUCKS and
• TANK CARS

TENNESSEE CORPORATION
617-29 Grant Building, Atlanta, Georgia



SID KARSON

UNFOLDING A REFRESHER: Paper washcloths foil travel, office grime.

Quick Cleanup in a Packet

Nearly everybody who's survived childhood is familiar with the way mothers use a handkerchief to remove smudges from little faces. That's the plain, if not too elegant, ancestry of one of the hottest specialties in the convenience field, R. R. Williams, Inc.'s (Canaan, Conn.) Wash-'n-Dri.

Now issued to each patron by some 30 U.S. airlines, and available in many trains and hotels, too, Wash-'n-Dri is a paper "towelette," packed in a 2¼x3-in. foil envelope. When opened (*see cuts*), the towelette unfolds to 6x8½-in. size—moist and ready to use on face and hands. Airlines use it as a handy fingerbowl, but its applications are broad—to remove smudges, cosmetics, to freshen up anywhere.

A patent-applied-for item, it's a sheet of wet-strength paper, moistened with an alcohol-containing, perfumed formulation (details of which the firm keeps secret, although Williams says no synthetic detergent is used). The towelette dries face and hands rapidly, gives a cooling, nonsticky effect.

The paper is packed in Regal Paper Co.'s Pouch-pak—a foil packet lined with polyethylene. These are turned out in Williams' Canaan plant by a force of some 50 employees—it's the town's only factory.

And so far, Wash-'n-Dri is the firm's only product. It was a slow starter. Introduced in mid-'54, it is just now reaching its stride. This year, distribution touches major stores in all 48 states, and Wash-'n-Dri is licensed in France, Iran, and some Latin American countries.

Wash-'n-Dri has no competition so far—and with patents, Williams hopes to keep things that way. At present, the firm's biggest problem has been meeting orders—and it would like to keep things that way, too.

•

Fight's Off: Patent litigation between Coloramic Coatings, Inc. (Los Angeles) and Sherwin-Williams Co. and its affiliates over multicolor paints has been ended with S-W licensing the Coloramic process.

•

Speed and Accuracy: New-model liquid filling machines are being introduced by Arthur Colton Co. (Detroit). Suitable for liquids of widely varying viscosities, the new machines are said to have an accuracy of over 99%, and to be faster-working than the firm's older models.

EXPANSION . . . .

Adding in Adhesives: A. E. Staley Mfg. Co. (Decatur, Ill.) is adding a new Adhesives Section to its technical service department. The new lab will concern itself both with product development and with product service.

• Paisley Products, Inc. (New York) has acquired Woerz Paste and Gum Co. (Los Angeles). The firm will be operated as a Paisley division.

•

Streamlined Setup: Max Factor & Co. (Hollywood, Calif.) is planning to spend more than $1 million this year (out of retained earnings) to modernize and expand its facilities. Six Hollywood buildings will be refurbished, and a plant constructed in Toronto, Can.

•

Canadian Branch: J. I. Holcomb Manufacturing Co. Ltd. is now operating its new plant in Toronto, Can. The firm makes industrial and institutional cleaning and maintenance supplies.

•

Ohio Move: Expanding into Ohio with a 21,000-sq.-ft. plant in Alliance is John Puhl Products Co. (Chicago). The firm, a division of Sterling Drug, Inc., will produce bleach and ammonia products for household use. It will also distribute the firm's cleaner fluid and lighter fluid.

•

Name Switch: Rowe Products Inc. is the new name of Rowe Paint & Varnish Co., Inc. (Niagara Falls, N.Y.). A diversification of the firm's line of products brought about the change; ownership, management, personnel, products and policies reportedly will remain the same.

•

Doubled Output: Decatur Chemical Co. (Atlanta, Ga.) has recently doubled its facilities for production of paint. The firm is now pushing its water paint based on vinyl latices.

PRODUCTS . . . .

Floor to Floor: Fuller Brush Co. (Hartford, Conn.) is selling Floor Cleaner, a product with detergent action to remove old wax and dirt and prepare floors for new wax. As is the rest of the Fuller line, Floor Cleaner is sold house-to-house. A 22-oz. can sells for $1.15.

•

Plasticizer Notes: Some new plasticizers have recently been marketed:

• Waterlac Finish Co. (Danvers, Mass.) is now selling one designed to replace tricresyl phosphate in such materials as vinyl wire coating, vinyl, cellulose acetate and butyrate, and ethyl cellulose surface coatings. On a pound-for-pound basis, the new compound, called Chloroplast A, is said to be about 20% cheaper than TCP. Claimed advantages: greater resistance to yellowing, superior electrical properties, equivalent low-temperature properties.

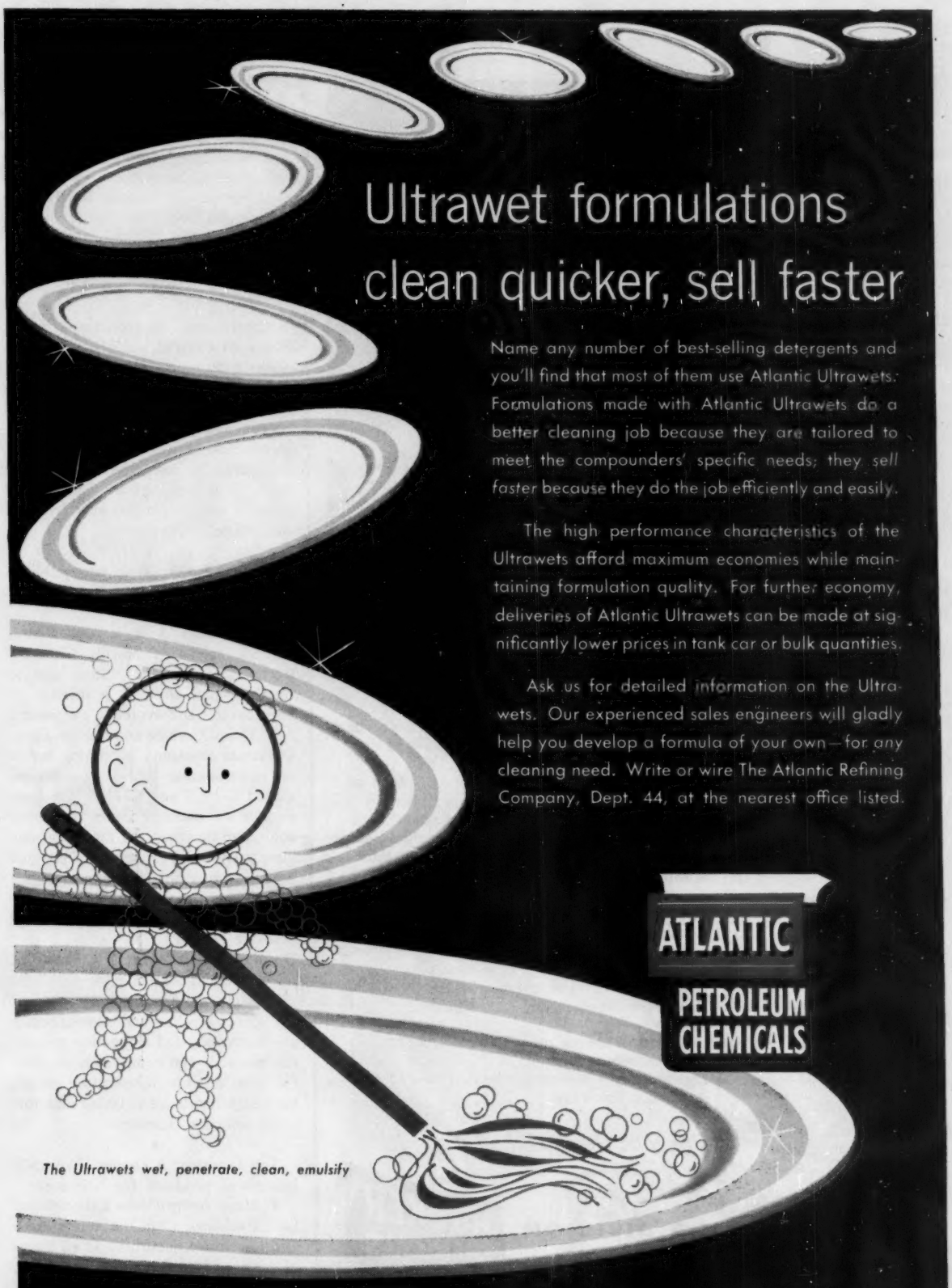
• Rubber Corp. of America (New York) is now selling a replacement plasticizer for normal octyl decyl

Ultrawet formulations clean quicker, sell faster

Name any number of best-selling detergents and you'll find that most of them use Atlantic Ultrawets. Formulations made with Atlantic Ultrawets do a better cleaning job because they are tailored to meet the compounders' specific needs; they *sell faster* because they do the job efficiently and easily.

The high performance characteristics of the Ultrawets afford maximum economies while maintaining formulation quality. For further economy, deliveries of Atlantic Ultrawets can be made at significantly lower prices in tank car or bulk quantities.

Ask us for detailed information on the Ultrawets. Our experienced sales engineers will gladly help you develop a formula of your own—for *any* cleaning need. Write or wire The Atlantic Refining Company, Dept. 44, at the nearest office listed.



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The Ultrawets wet, penetrate, clean, emulsify

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In the West
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In Canada Naugatuck Chemicals
Division of Dominion Rubber Company, Ltd.

In Europe
Atlantic Chemicals SAB, Antwerp, Belgium

In South America
Atlantic Refining Company of Brazil, Rio de Janeiro

Thousands of feet down under the nodding pump units, valve cups expand and release with every stroke to bring up the treasures of petroleum.

Continuous pumping is desirable, but when cups become worn, flow declines to a point where wells must be taken out of production and the cups replaced.

Then intensive research developed a blend of Hycar* nitrile rubber and two Durez phenolic resins. This was the answer . . . the resins' high resistance to abrasion and corrosion enables pumps to swig up crude, *non-stop,* for as much as three months longer. More barrels per cup!

In *your* business, are profits tied to a material or a process that could be made better with the Durez phenolics? As modifiers, coatings, or binders, these resins link properties in remarkable combinations—strength, insulating value, resistance to high and low temperatures, humidity, abrasion, most acids, and mild alkalies.

At your command are the integrated research, production, and service facilities of the Hooker organization—50 years in chemicals and 35 years in plastics. Just write.

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Hycar trademarked by B. F. Goodrich Chemical Co. Hycar-Durez cups made by Dragon Mfg. Co.

SPECIALTIES . . . . .

phthalate (NODP), called RC D-31. A blend of di-isodecyl phthalate and di-isodecyl adipate, it is suggested for use with polyvinyl chloride, offers low volatility, reduced water-sensitivity, good heat-stability.

A companion product is DIDP-10, formulated for PVC wire coatings, films, floor tile, etc. It is said to improve low-temperature brittle points, resistance to extraction by soapy water.

•

Crystallized Sequestrant: Perma Kleer 80 Crystals are now offered by Refined Products Corp. (Lyndhurst, N.J.). Suitable for dry mixtures (because it is nonhygroscopic and won't cause caking), it is said to have a higher content of active chelating agent than any other commercially available form. It is designed to sequester all divalent metal ions, and most trivalent metal ions.

•

Rubber Notes: Some new products for the rubber industry have just hit the market:

• Nevastain A is a rubber antioxidant, made by Neville Chemical Co. (Pittsburgh, Pa.). It is said to improve the physical properties of both natural and synthetic elastomers.

• Union Carbide and Carbon Corp. (Silicones Division) is offering a pair of new silicone rubber compounds. Coded K-1025 and K-1028, the compounds are available in red or neutral color, are designed for rapid one-step curing of thick sections. Suggested uses: oven door seals, refrigerator door gaskets, motor mounts. The rubbers are cured with di-*tert*-butyl peroxide (DTBP).

• Connecticut Hard Rubber Co. (New Haven) also offers a couple of silicone rubbers, Cohrlastic HT 655 and HT 666. Tensile- and tear-strengths are improved, and elongation properties boosted. The compounds are useful over a wide temperature range, have high resistance to ozone deterioration, abrasion, tearing.

•

Top Dressing: A couple of recently introduced products for hair care:

• Rinse Away (Skan Laboratories, Inc., Pasadena, Calif.) is a new rinse said to remove dandruff and all traces of soap, and to "condition" the hair. Six-ounce bottle retails for $1.

• Dresset is a new hair-setting chemical just marketed by Turner-Hall Corp. (New York). For beauty salon

Timed to your needs

USS CHEMICALS

United States Steel offers prompt and efficient service on these chemicals

United States Steel has ten plants producing chemicals. When you order your chemicals from U.S. Steel, you are assured of service and shipment to meet your production needs. For more information, contact our nearest Chemical Sales Office, or the United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

See "THE UNITED STATES STEEL HOUR"—Televised alternate weeks—Consult your newspaper for time and station.

USS Chemicals

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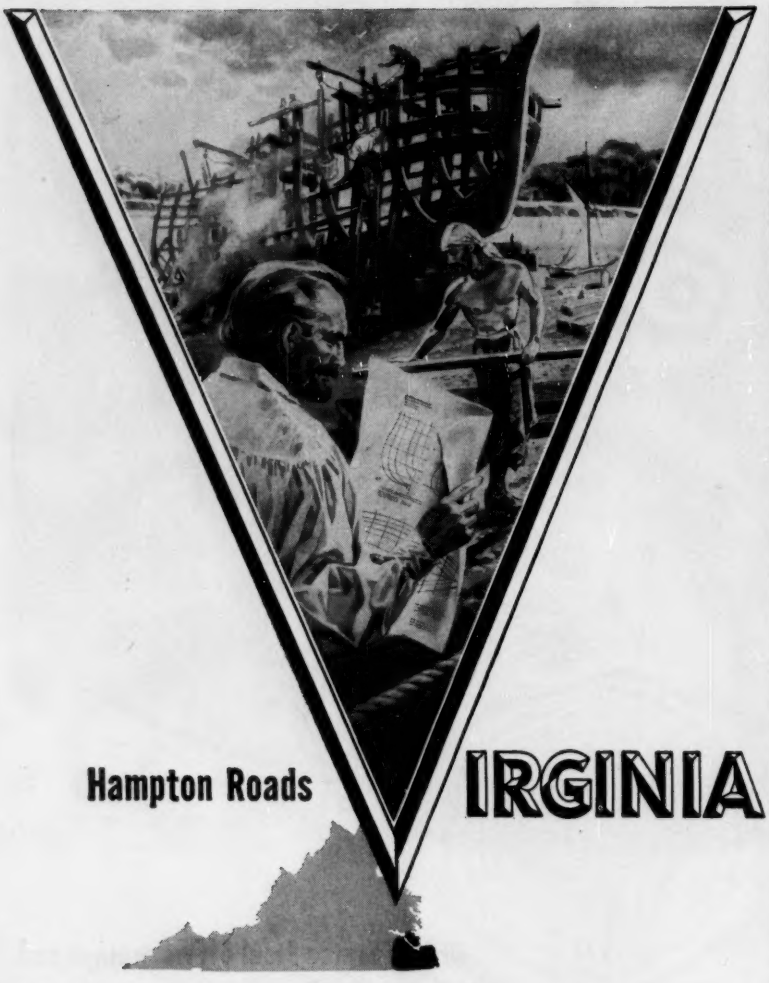

HE LAID THE KEEL OF TWO INDUSTRIES . . .
where deep-water shipping can serve your plant direct

SIR THOMAS ARGOLL wrote in 1613: "Went forward with my Frigat at Point Comfort, and finished her." She was the first big ship built in this country, and her first voyage was "for getting fish." Shipbuilding and fishing are still important to Virginia's Hampton Roads area, where a varied industrial output now totals $683,000,000 a year.

IF YOUR PLANT CAN PROFIT by a deepwater site, you will find the finest at Newport News, Norfolk, Portsmouth and South Norfolk. Over 300 ship lines link the harbor to 286 world ports, with sailings every 90 minutes. Three airlines, 9 major railroads and 45 truck lines serve this magnificent midway East Coast port and offer favorable rates to the Mid-west.

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SPECIALTIES . . . . .

use, the new material is sprayed on. It is said to hold a set for a week. Without describing its composition in detail, Turner-Hall says its product is not a permanent wave, nor a lacquer, nor an ordinary hair-set compound. It can be "reactivated" with plain water, but is removed by shampooing.

•

Variety Show: American Can Co.'s versatile no-drip containers—originally developed for synthetic liquid detergents, but since adapted to a number of products—are now being equipped with a no-drip spout of polyethylene. Formerly used: aluminum lips. Canco also says these new products are now packaged in its no-drip containers:

- Shina Dish, a syndet made by Tidy House Products (Shenandoah, Iowa) and selling in 28 states. Twelve-ounce can sells for 39¢.
- Real Kool, a pressure-packed, soft-drink concentrate put out in Canco's 16-oz. aerosol can by C. C. Lang & Son, Inc. (Baltimore). Still in test-market, the new product is available in 6 soft-drink flavors, can be used with tap or sparkling water. A tablespoonful of concentrate is used to make a glassful of drink.

•

Beard-Tailored: Rise, Carter Products' aerosol shave cream, is now being sold in three formulations—regular, menthol, and extra heavy. All three sell for 69¢/can.

PATENTS . . . . .

Stain Chaser: Toothpaste composition developed by Colgate is designed to remove tobacco stains. It contains a water-insoluble polishing agent, and a nonionic, water-soluble condensation product of ethylene oxide and a polypropylene glycol (British Pat. 743,936).

•

Detergent-Disinfectant: About 0.02-0.1% halogenated 2,2′-dihydroxy diphenylmethane is the disinfectant in a washing powder formulation worked out in Germany (British Pat. 744,433).

•

No Loss of Gloss: Longer-lasting stability is claimed for a silicone polishing formulation worked out by Kayeff Industrial Products Ltd. (England). According to British Pat. 744,403, saturated fatty acids, alkali hydroxide or sodium borate, mineral spirits, silicone oil, water and a dispersing agent go into the new polish.

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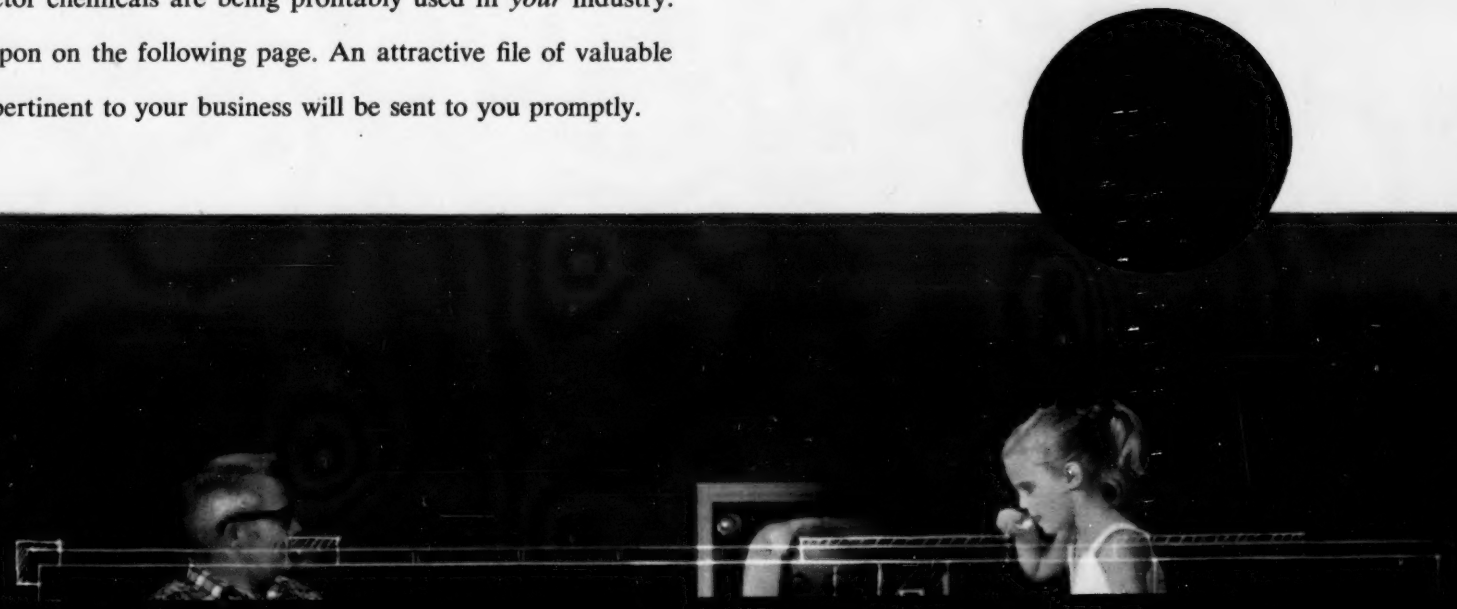
Are you looking for a way to increase cement production? Or for a chemical that will improve your detergent? A better way to fire-proof plastics, cloth, paper, wood? Perhaps your problem is to improve ceramics and vitreous finishes. Whatever your plans are for product or process improvement, it will pay you to see Victor.

Victor chemicals and Victor research service have benefited hundreds of products for a wide variety of industries. Send for the Victafile that tells how Victor chemicals are being profitably used in *your* industry. Mail the coupon on the following page. An attractive file of valuable information pertinent to your business will be sent to you promptly.



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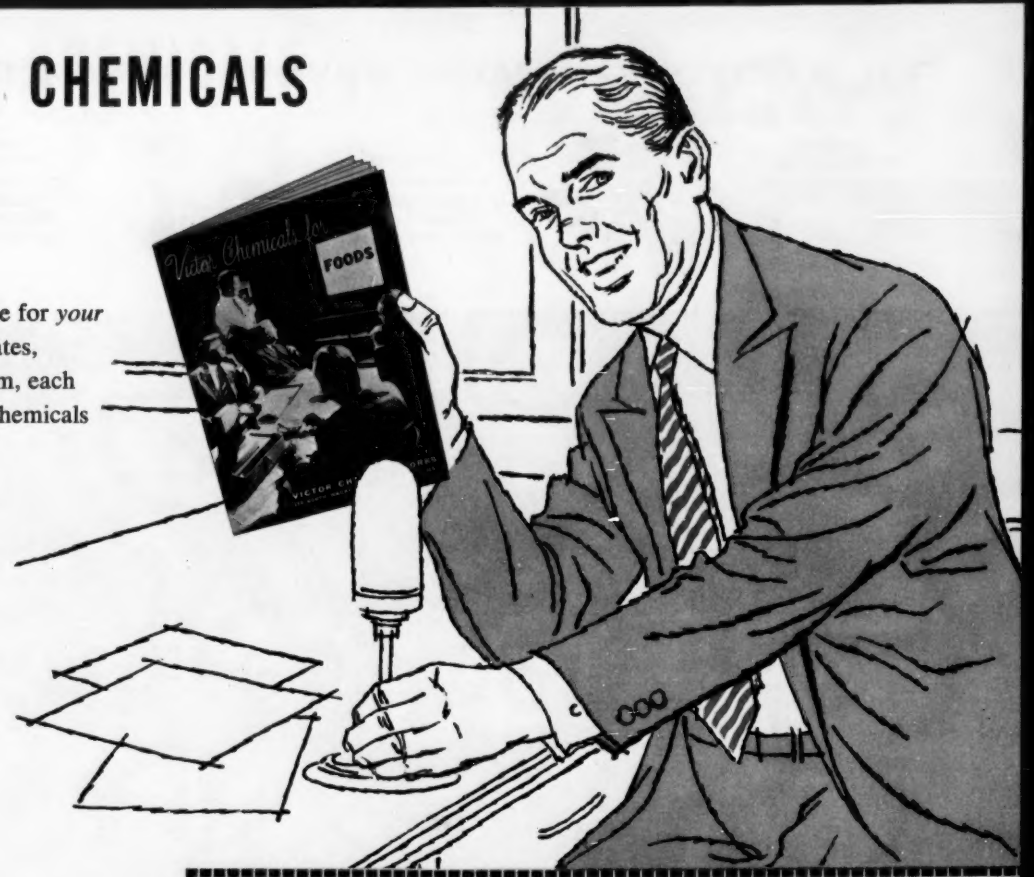

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☐ We have a particular problem; if there's no obligation, please have technical service representative call.

Research department is starving for good ideas.

A few ideas from sales seem to have potential.

But, on analysis, some fizzle, must be rejected.

Do You Know How to Say No to Sales?

Even the busiest research director must keep alert for new project ideas. That's why—if he's smart—he encourages suggestions from the sales department—even though he gets many that quickly are revealed to be useless. Turning down the duds, without fostering hard feelings, is an exercise in human relations that is becoming more and more important with the quickening pace of competition in the chemical industry.

One experienced research director reports that he turns down technologically unfeasible suggestions by: (1) asking for market information, basing his rejections on commercial reasons the salesman is likely to understand; (2) saying the idea is good but that the research schedule is too full to allow work on it; (3) pigeon-holing the suggestion.

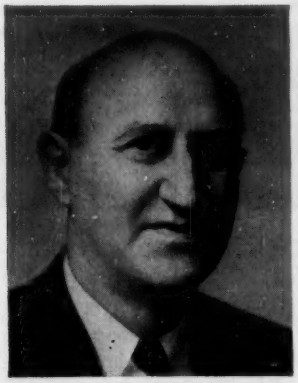
Another research executive takes this stand: "Salesmen are by nature thick-skinned. They're used to being turned down, so we don't worry too much about how to do it. We have more trouble with our own technical men's brain-children that don't make the grade."

Between these extremes, a variety of ideas and practices are to be found.

Quaker Oats Co.'s research vice-president, Fredus Peters, says: "If an idea is worthwhile, naturally we try it out. But if it's something we've already tried, we tell the man that. If the idea is no good, we carefully explain why, and try in a friendly way to make the man understand. We never want to shut off a source of ideas by improper handling of rejections—that's suicide."

Peters cautions that a truthful answer is important. Sometimes, he points out, a salesman will resubmit an idea after a period of time. If it is then rejected for a different reason, he may well feel both rejections are unjustified.

At Dearborn Chemical Co., ideas are appraised by a product planning



VICTOR'S ADLER: 'Rejections are the hardest thing I have to do.'

SWIFT'S NEWTON: 'We consider all ideas, because you never know.'

QUAKER'S PETERS: 'Improper handling of rejections—that's suicide.'

committee comprised of representatives from all the company's operating divisions (research, production, sales, engineering, accounting, purchasing, etc.). The committee provides a number of slants on any one idea, sometimes turns up a different application from the one intended.

According to Dearborn's J. Fred Wilkes, director of research and product development, this plan provides relatively impersonal but gentle evaluation of ideas. "It's a prime rule," says Wilkes, "that every idea is acknowledged at once. If the idea is judged not feasible at the first sitting, the individual who submitted it is told in detail why it was rejected. Otherwise, the committee feels, sources of potentially valuable ideas would be shut off."

Even after rejection, under this plan, the individual may submit new evidence as to why he still thinks his idea is sound. In any case, however, decision is postponed until market research, capital investment, toxicity, containers, profit margin and the like can be investigated. Then the committee decides whether to accept or reject the proposition.

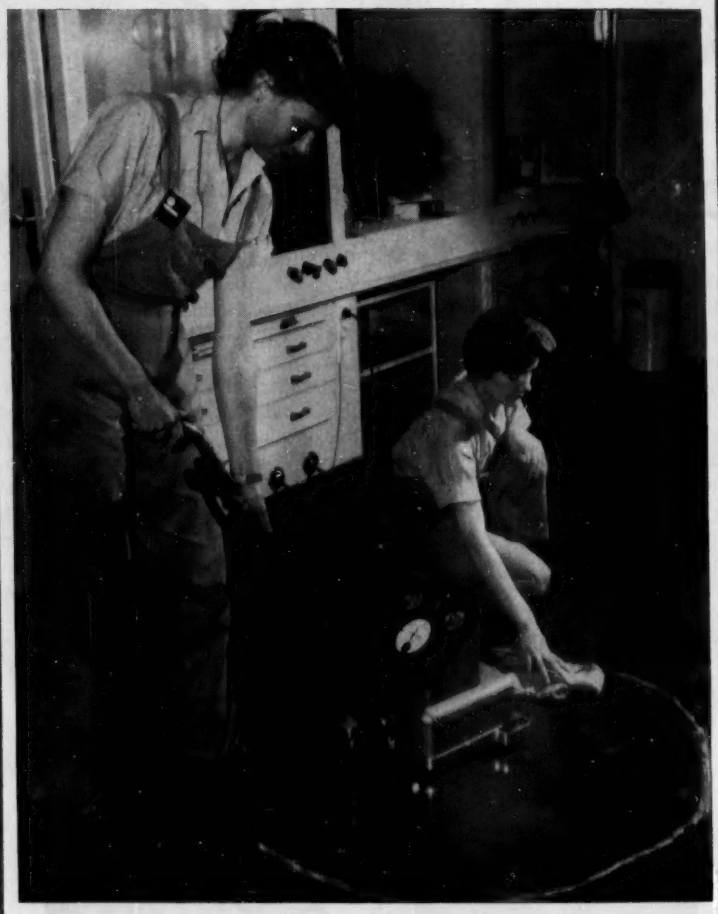
In sharp contrast, Howard Adler, Victor Chemical Works' research head, screens ideas informally, often by huddling with the sales manager. If salesmen in the field submit ideas, Adler and his staff check them over thoroughly, outline any reasons for rejection. "Rejections," says Adler, "are the hardest thing I have to do." But he's careful not to stifle salesmen's proclivity for making suggestions. He appears at a sales conference once a year "to reiterate that the research department is starving for good ideas" and that all ideas should be submitted, no matter how far-fetched they sound. Several times during the year, moreover, requests for ideas are sent out.

Similarly, Paul Manning, International Minerals & Chemical Corp. research vice-president, treats no suggestion lightly. Whenever possible, Manning encourages an individual submitting an idea to sit in on decision sessions, take part in discussions. "This way," says Manning, "he'll generally reach a frame of mind where he does his own rejecting, will retain his enthusiasm, but do more intensive screening of his own ideas next time."

Regardless of the evaluation procedure that's employed, it's important, declares Swift & Co.'s research vice-president, Roy Newton, that the research department have top management's backing in these decisions. "It must be clear to the sales manager that ideas from his department are merely suggestions that may be turned down," says Newton. "If this is not the case, the research director had better look for a new job."

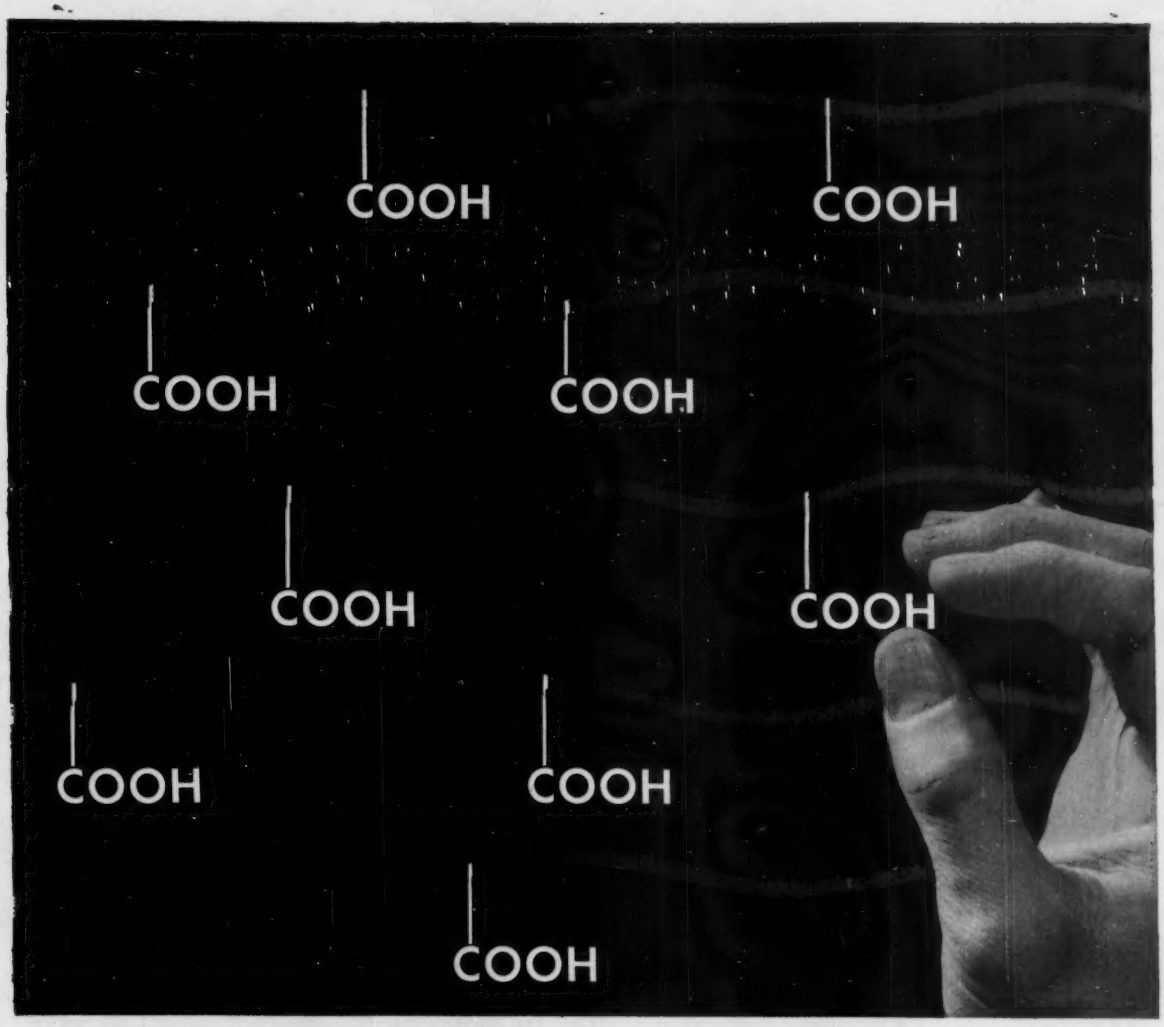
"We consider all ideas," explains Newton, "because you never know when one might be a nugget. We may give economic reasons for a rejection. We may conclude that the idea might bear fruit eventually, but is not as promising as current projects."

Newton advises that a few ideas that come in from sales "seem to have tremendous potential," and that it's important to keep all ideas coming in. That's why he, like his colleagues, feels that the all-important factor in rejecting ideas is tact. Sometimes hard to summon, it's the earmark of a really capable research administrator.



How Clean Can a Floor Be?

DISTAFF TEAM at Bayer Chemical Works' new isotope laboratory uses a special geiger counter and lots of elbow grease to keep floors free of radioactivity. Located in Wuppertal-Eberfeld, Germany, the lab is one of the best equipped in Europe, supplies hospitals, research centers and industry with radioactive tracers and products.



How to add carboxyl groups to polymers ...copolymerize with methacrylic acid

By copolymerizing methacrylic acid with such monomers as styrene, acrylonitrile, butadiene, acrylates, methacrylates, or butadiene-acrylonitrile, you can get polymers containing free carboxyl groups. Copolymers can be made having one or more of the following advantages:

- **Zinc oxide cure**
- **More stable latices**
- **Solubility in alkali**
- **Better oil resistance**
- **Improved adhesion**

Glacial methacrylic acid is readily available from full-scale commercial production. Write to Department SP for further information on this acid—just one of the many acrylic monomers manufactured by Rohm & Haas Company.

CHEMICAL PROGRESS WEEK-APRIL 23-28
A BETTER AMERICA THROUGH CHEMICAL PROGRESS

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Representatives in principal foreign countries

CUT SISAL leaves stacked on this Kenya estate are chopped up (right) for hecogenin extraction.

Harvesting a Cortisone Precursor

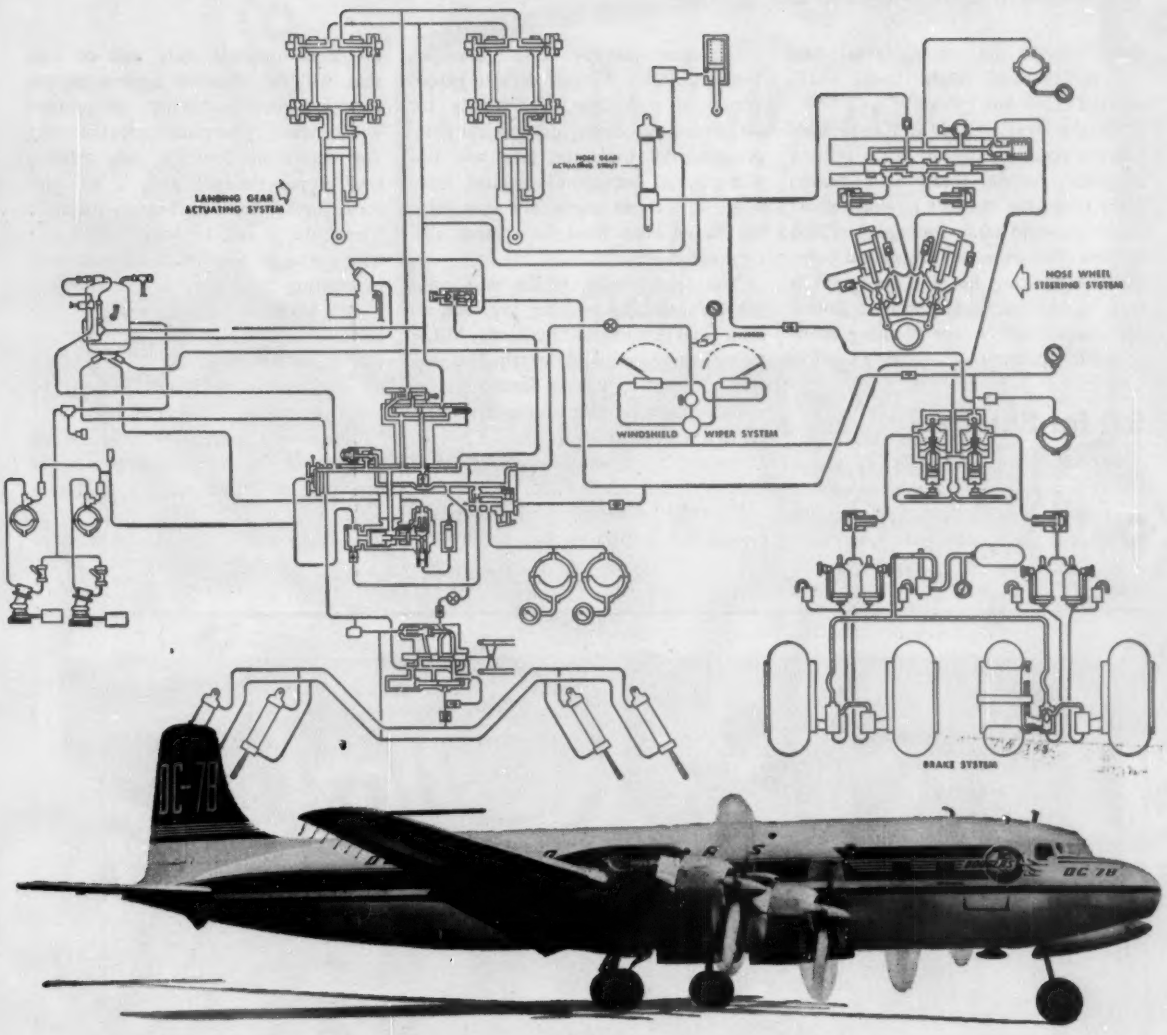
Hecogenin—which never lived up to its original promise—may still make the grade as a cortisone precursor.

That's the opinion of these Kenya researchers who—after four years of experiments—claim to have overcome a major hecogenin drawback: low yields from its natural plant sources. Working with sisal, they've found the steroid sapogenin can be recovered in appreciable quantities from waste matter left behind after the fibers are removed from the long, spiky leaves.

Their pilot plant is located at East African Sisal Estates, Ltd. (Ruiru, near Nairobi), is now supported by the estate. Earlier work was carried out with funds from the estate, the British Medical Assn., the British National Research Development Corp. and the East African Industrial Research Board.

Another hecogenin pilot plant has recently been started in Tanganyika, will work closely with Kenya's Ruiru team. If either is successful in establishing hecogenin in large-scale cortisone manufacturing, it will mean an important dollar saving to Britain. All its cortisone raw materials now come

CHEMIST Allan Williams mans the filter at the pilot plant, which was built by I. S. Robertson (right).



Enjay Butyl rubber— vital artery in newest airliners

Douglas chooses Enjay Butyl for rubber components of the hydraulic systems in many of its famous DC-7 airliners. These components, which help assure the dependable operation of everything from wing flaps to landing gear, are proving over millions of air miles their durability and resistance to wear.

Versatile Enjay Butyl rubber may well have a place in *your* operation. It will pay you to investigate the many technical advantages it has over other types of rubber. Its price and ready availability are advantages, too. For full information, and for technical assistance in the uses of Enjay Butyl, contact the Enjay Company today.

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Enjay Butyl is the super-durable rubber with *outstanding* resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

from outside the sterling area. And the achievement might boost sisal's current $246/ton price.

At the peak in 1951, Kenya sisal exports reached almost $19.6 million in value. As the result of a drastic price drop, the current annual export value (for the same tonnage) is $5.6 million. Nevertheless, plantation owners are banking heavily on research such as the hecogenin project to expand sisal outlets, are planting more sisal each year.

Set for Screening

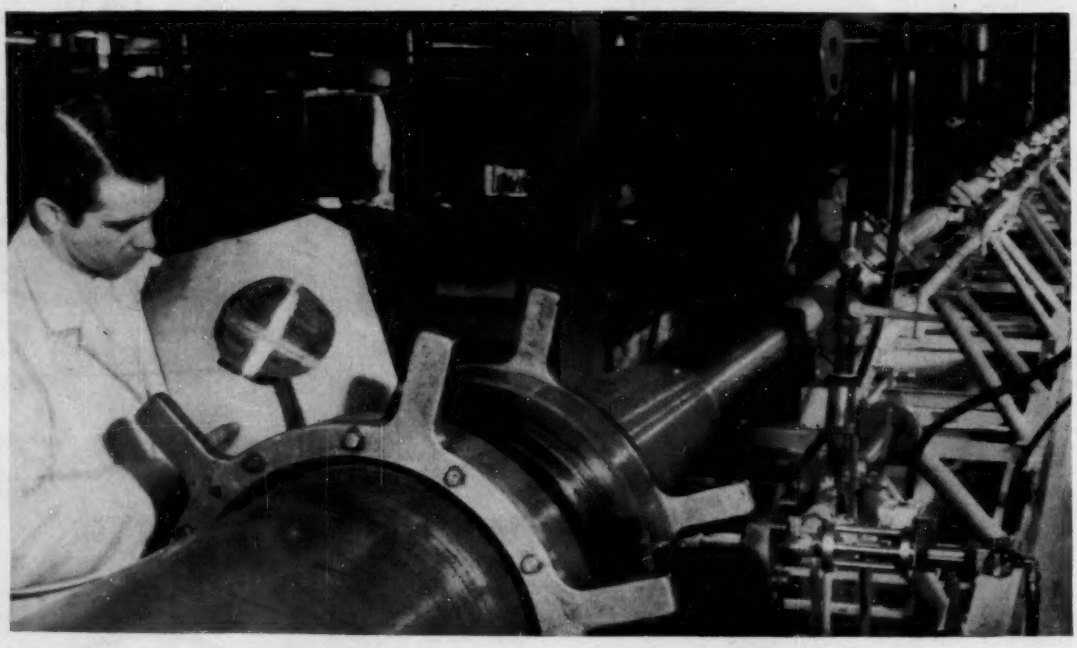
Between now and July 1, about 100,000 mice will see service in the government's newly launched, massive program to uncover new chemicals for cancer therapy. Last fortnight, the U.S. Public Health Service placed contracts with five laboratories for large-scale screening of chemical compounds. All told, the labs will test some 2,000 compounds against three types of cancer implanted into mice that have been bred for cancer susceptibility.

The laboratories, which will commence screening at once, are: Microbiological Associates (Bethesda, Md.); Wisconsin Alumni Research Foundation (Madison, Wis.); Southern Research Institute (Birmingham, Ala.); Hazleton Laboratories (Falls Church, Va.); and Stanford Research Institute (Menlo Park, Calif.).

They'll follow special screening procedures, expect to find among the 2,000 compounds only one or two that will be effective against mouse cancer. Even surviving compounds will require pharmacological testing (to determine toxicity, side effects, and proper dosage) and, if satisfactory, further tests on human patients. Therefore, it will be years before the true value of any of the compounds in treating human cancer is known.

At present, cancer cures are achieved only by surgery or radiation. But some forms of the disease, such as acute leukemia, don't respond to these treatments. Other forms can't be diagnosed until they have spread throughout the body—too late to be benefited by either surgery or radiation.

In such cases, says Surgeon Gen-



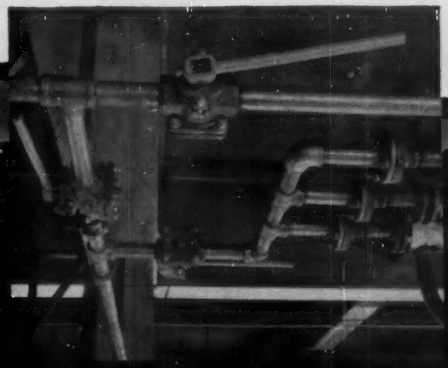
Inside: Hotter than the Sun's Surface

GASES GET AS HOT as 15,000 F in this shock tube built by Avco Manufacturing Corp. at its Everett, Mass., research laboratory. Intended for missile materials studies, the 100-ft.-long device explodes a mixture of hydrogen and oxygen (containing some helium and nitrogen) to achieve these elevated temperatures. Here's how it works: gases in the heavy "driver" section (*foreground*) are put under extreme pressure; they burst through a steel plate, generate shock waves that speed through the 4-in.-diameter tube extending into the background at the right. Shock waves have been clocked electronically at speeds of more than 18,000 miles/hour.

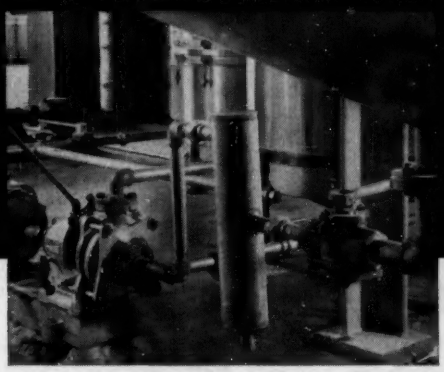
Designed for Air Force studies, the shock tube is the charge of Avco physicist Arthur Kantrowitz. It is expected to shed light on a major metallurgical problem: how to keep proposed high-speed missiles from disintegrating as a result of friction with the earth's atmosphere.

THE DURCO STORY AT LINDSAY CHEMICAL COMPANY

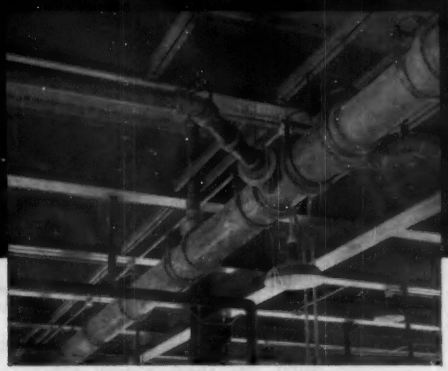
Durco #3C Heat Exchangers (bottom of photo) handling nitrate solutions. (Bulletin M/2) • Durco #4C Heat Exchangers (top) handling sulfuric acid. (Bulletin M/4)



Durco Type F Valves with Teflon sleeves handling nitrate solutions. (Bulletin V/4)



Series R Durcopump (Bulletin P/1) and Durco Type F Valves handling sulfuric acid.



Duriron Acidproof Drain Pipe (3" to 12") handling a variety of waste acid solutions. (Bulletin PF/4)

Lindsay Chemical Company is the world's largest producer of thorium and rare earth chemicals. Durcopumps, Durco Type F Valves, Durco No. 3 and No. 4 Heat Exchangers, and Duriron Acid Proof Drain Pipe provide the answers to Lindsay's severe corrosion problems. The Duriron Company and Durco engineered equipment have been serving Lindsay Chemical Company, as they have served most of America's leading manufacturers, for many years.

Durco engineers are located in principal cities to help you solve your corrosion problems. In addition to the bulletins mentioned in the captions, Catalog 54 briefly describes our complete line of alloys and equipment. We will be happy to send your free copy today.

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CORROSION RESISTING ALLOYS & EQUIPMENT

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BRAND C
Dissolved, turbid—71 seconds
BRAND D
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SHEA sodium phosphate granules dissolve faster . . . end lumping problem!

A simple test you can make in a minute proves beyond doubt that Shea's sodium phosphate granules dissolve faster than competitive products.

The reason: the physical form is different.

Shea's granular phosphates are spray-dried. Each granule becomes a tiny air-filled bead. Shea tripoly and tetra granules pour easily, float into solution, dissolve much faster. No lumping problems to cause time delays.

Make your own test. Note the clearer solutions. Observe, too, that Shea granular phosphates are lower in bulk density; higher in sequestering power — and have fewer dusty particles to annoy you and your customers.

Ask for samples today.

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Tetrasodium Pyrophosphate
Disodium Phosphate
Trisodium Phosphate
Sodium Hexametaphosphate
Phosphoric Acid
Dicalcium Phosphate Feed Grade
Phosphate Feed Solution

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RESEARCH . . . . .

eral Leonard Scheele, chemical treatment appears to offer the greatest hope. Six compounds comprise the principal chemical weapons against cancer. These are: methyltestosterone; diethylstilbestrol; and four agents for acute leukemia — 6-mercaptopurine, azaserine, 4-aminopteroylglutamic acid (aminopterin), and 4-ammo-N-10-methylpteroylglutamic acid (amethopterin). But even these only prolong the useful life of patients; they do not cure.

APPARATUS . . .

New Flow Counter: North American Phillips, Inc. (Mount Vernon, N. Y.) is out with a new flow proportional counter, aimed at detecting and measuring elements in the periodic table down to and including magnesium (number 12). It's built for use in conjunction with standard North American x-ray spectograph (and helium attachment when needed). Features claimed for it: sensitivity, high counting rate (over 60,000/sec. for soft radiation), low operating rates.

•

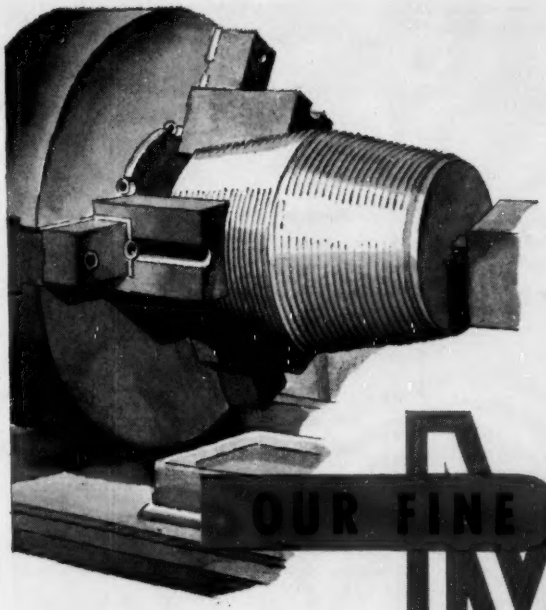
Sample Mixers: An electric mortar, just introduced by Spex Industries, Inc. (Queens Village, N.Y.), is said to simplify the task of mixing samples for spectrographic analysis and for other small-volume specialized uses. The instrument gives reciprocating action in the form of a figure-8. The sample wings through an arc at 3,200 rpm., causing the pestle ball to strike the end of the vial 200 times a sec.

•

High Intensity Light: Phoenix Precision Instrument Co. (Philadelphia, Pa.) has a new high-intensity regulated monochromatic light source for use with monochromatic filters. A high-pressure mercury vapor lamp, it produces strong radiations at 365, 406, 436, 546 and 578 $\mu\mu$, operates on 115-volt, 60-cycle lines.

•

Wax Heater: Fisher Scientific Co. (Pittsburgh, Pa.), in cooperation with Atlantic Refining Co.'s standards laboratory, is out with a new device that can be attached to any Fisher/Tag Saybolt Chromometer, reportedly speeds wax color tests (by revised ASTM Method D-156). Called the Fisher-Atlantic Oil Tube Heater, it preheats the Chromometer sample tube and drain-cock, prevents the wax from



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RESEARCH . . . . .

congealing and clogging the tube. The Chromometer can still be used for other materials, e.g., naphtha, kerosene. Price: $95.

•

Settler: Causing solids to settle through an upward flow of liquid is the function of a 3-inch laboratory continuous contact column available from Allis-Chalmers Manufacturing Co. (Milwaukee, Wis.). It's said to be adaptable for a variety of operations, e.g., leaching, dissolving, decolorization, in exchange, absorption, oil extraction.

•

Abrasion Assayer: A simple, rapid device for determining the abrasion resistance of porcelain enamels has been developed by the National Bureau of Standards. It's said to be particularly useful for testing different types of finishes, including "orange peel" and wavy surfaces. Although designed primarily for porcelain enamels, the abrasion tester can also be used for other wear resistance determinations, e.g., highway paints, plastic and fibrous materials, organic finishes.

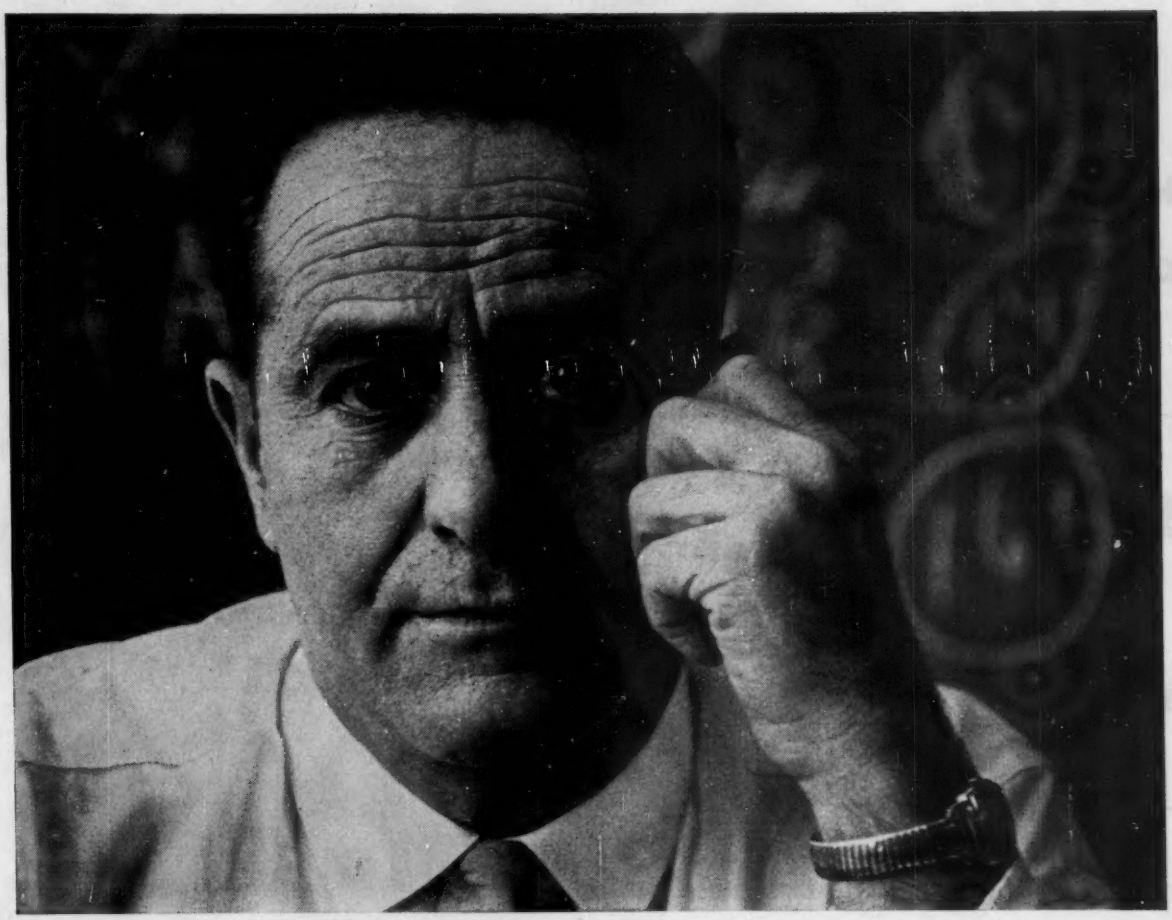
REPORTS . . . . .

An array of topics is covered in new government reports available from the Office of Technical Services, U.S. Department of Commerce (Washington 25, D.C.).

• PB 111798 on the "Electrodeposition of Titanium" describes a procedure for putting a diffusion coating of titanium on iron, mild steel, copper and other metals. Data are also presented on the corrosion of titanium in fused salts, the resulting products, and probable mechanism. Cost: $1.50.

• PB 111752, "A High Rate Testing Machine," details the design and construction of a device for measuring tensile and compressive properties of solid propellent compositions at high rates of deformation. Price: $1.

• PB 111863, "Effects of Radiation on Dielectric Materials," is a compilation of papers submitted at a Naval Research Laboratory conference on the subject in December 1954. Included: radiation stability of polymers, a survey of the chemistry of polymer formation effects on glass, conductivity of polyethylene and Teflon during irradiation, and an evaluation of the effects of radiation on organic materials. Price: $4.25.



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161	Triethylene Glycol Dimethyl Ether $CH_3(OCH_2CH_2)_3OCH_3$
181	Tetraethylene Glycol Dimethyl Ether $CH_3(OCH_2CH_2)_4CH_3$ (Dimethoxy Tetraethylene Glycol)
222	Ethylene Glycol Diethyl Ether $C_2H_5OCH_2CH_2OC_2H_5$

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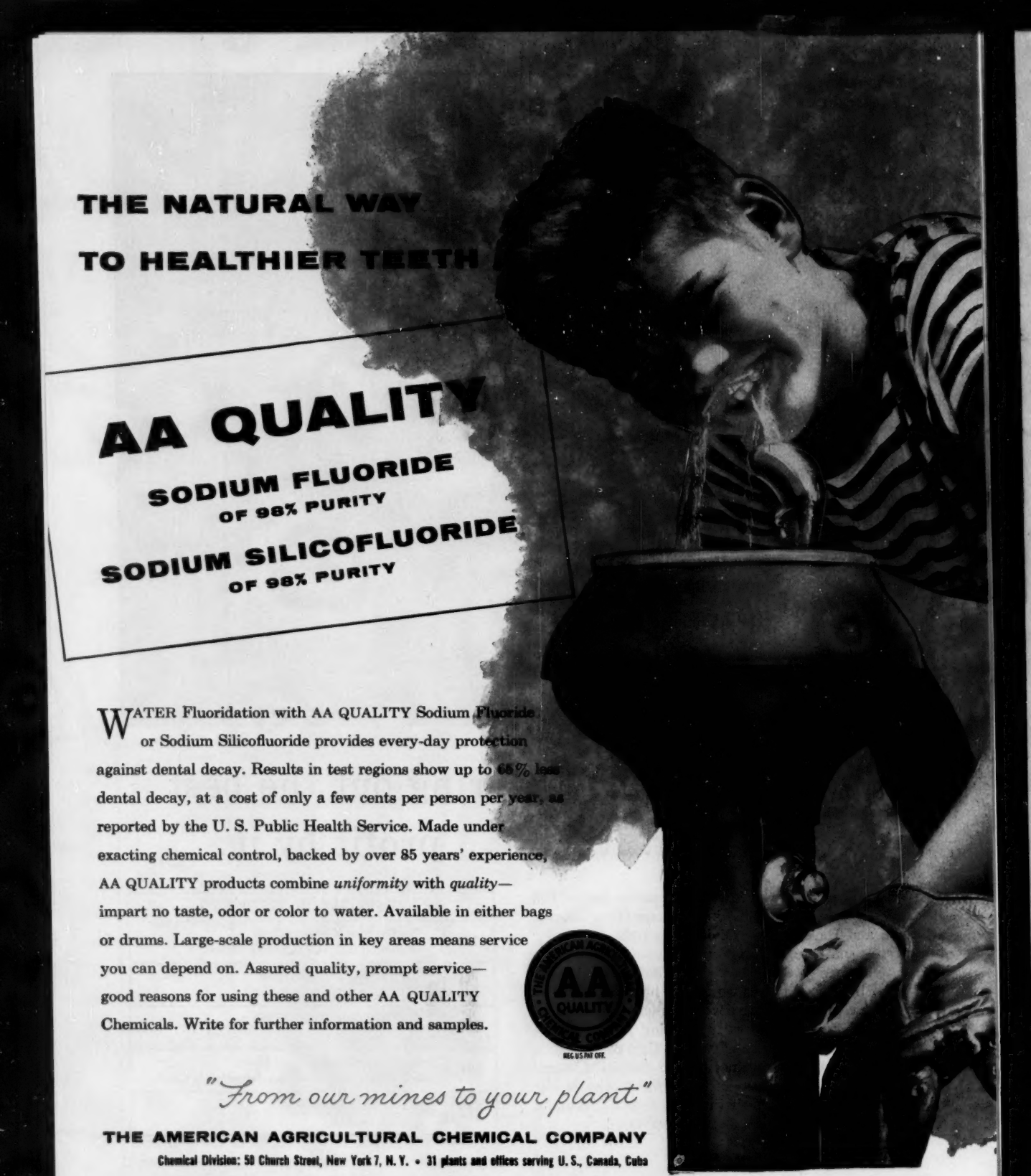

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Technology

Newsletter

CHEMICAL WEEK
April 14, 1956

Continuous ion exchange will get a shot in the arm with the purchase by Du Pont of a continuous countercurrent exchange unit developed by Robert Porter, a Salt Lake City metallurgist.

Peterson Filters, of the same city, has been working with Porter on the system, piloted the unit that supposedly "proved out" the idea. And now it's building a full-scale, $18,000 operating unit for Du Pont.

Porter's unit utilizes a slug system in moving bed to remove the resin for elution or regeneration. Fresh resin, fed to the reactor column at top, is suspended in reactor chamber by force and volume of entering pregnant liquor. On the surface, that doesn't appear to be significantly different from previous efforts to put countercurrent ion exchange on a continuous basis.

But Porter foresees his ideas being put to work in uranium processing, de-ionizing sugar, and purification of brackish water in mining operation. All three uses are particularly important in the Intermountain area.

•

Plans for a $50-million Science City will be unveiled this week. To be located on a 3,000-acre site on the outskirts of San Antonio, Tex., it will include residential and recreational areas as well as research facilities.

The project is being sponsored by Southwest Research Center (made up of Southwest Research Institute, Southwest Foundation for Research and Education, The Institute of Inventive Research). The idea, it says, is "to create an ideal environment for industrial research laboratories and high-level technical manufacturing facilities."

•

A synthesis of a new male sex hormone, Halotestin, was reported by John Babcock, of Upjohn, at the meeting of the American Chemical Society in Dallas this week. Investigations are still in a fairly early stage, but Babcock thinks the hormone may prove to be more potent than methyltestosterone, the only oral androgen currently available to doctors for therapeutic purposes.

•

Don't count hydrazine out of your long-range planning yet. Olin Mathieson, the bigger producer, is bullish on the chemical's future; although Fairmount, long-time hydrazine maker, is now bearish.

OM is about to pack hydrazine in small containers for sale to industry. Growth of some of the hydrazine derivatives—like Naugatuck's growth-regulant, maleic hydrazide—is encouraging.

Moreover, research on new, simpler processes to replace the old Raschig synthesis is still going on. Stanford Research Institute, for instance, is now putting together data on a nonaqueous electrochemical process. Still to be conquered: control of formation and dissociation rates.

Hydrazine now sells for $2-3/lb. (depending on grade). That should be low enough to let development catch on. But a simpler process (like Stanford's) that would really slash the manufacturing costs would push it into a chemical of commerce in no time at all. Hydrazine's military future is uncertain at the moment; the accent is now on unsymmetrical dimethylhydrazine as a rocket propellent.

•

Watch for word soon on a new tranquilizer out of Pfizer. It will be tagged Atarax (from the Greek "ataractos," meaning high hope) and is said to be a milder type of mental drug than those now in use. Based on piperazine, the compound is a Belgian import. Pfizer's Roerig division (Chicago) will make it.

Technology Newsletter

(Continued)

Enticed by the tremendous opportunities in rocket fuels, both liquid and solid (*CW Report April 7, p. 61*), more and more firms are pressing the search for more powerful propellents. In the news:

• Phillips Petroleum has just successfully tested a king-size rocket that developed the highest thrust ever attained by a single rocket motor. The record-setting push was provided by a petroleum-base fuel—the newest member in a family of solid propellents developed by Phillips for the Air Force.

• Hercules Powder has been chosen, with Grand Central Rocket Co. (Redlands, Calif.), to develop the solid-fueled third-stage rocket for Project Vanguard—the earth satellite program.

•

Next week, the scientific community will have its first chance to air complaints on the pressing shortage of engineers and scientists before a group that's powerful enough—and interested enough—to do something about it.

A joint Congressional committee on atomic energy has invited 35-40 top-level educators and scientists to appear at a forum instituted by Rep. Mel Price (D., Ill.). A key topic on the agenda: Russia's technical manpower. The U. S. S. R. now has more working engineers and scientists than does the U. S., is training more at an ever-increasing rate.

Price's idea is to get Congress to appropriate money to expand science departments and engineering schools, and to provide scholarships for bright high school graduates who are willing to enter these vital fields. But the idea of pumping federal funds into education—with strings attached—has been around before, is still controversial.

The closest thing to Price's plan is the fellowship program of the National Science Foundation. This year, NSF will spend $1 million on 20 refresher courses for science instructors. It hopes Congress will up the ante next year to $10 million—enough to conduct 80 such sessions.

Based chiefly on the reasoning of NSF, the outlook is for (1) Congress to do something in the way of providing money for scientific education, probably next year, (2) a program of federal support to expand the types of programs NSF already operates—i.e., teacher training, rather than undergraduate scholarship programs.

•

A new production pool—American Scientific Technical Research Organization (ASTRO), Inc.—has been formed by five Detroit firms to bid on defense contracts. The five—Control Devices, Inc.; Metallurgical Consultants, Inc.; Dri-Flo Manufacturing Co.; Hefco Laboratories, Inc.; Raynolds Plastics, Inc.—plan to carry out research and development work in chemistry, plastics, electronics, metallurgy and nuclear energy.

•

You can expect to hear more about the Dept. of Agriculture's newest experimental antibiotic mixture, F-17, crude culture filtrate, containing three—or possibly four—antibiotics. It has effectively controlled bean rust in preliminary greenhouse tests, will be field-tested by the U. S. Dept. of Agriculture later this year.

•

The process industries may learn more about the atom's role in chemical processing when the AEC completes its final check on Armour Research Foundation's reactor. Fuel elements are on the way, and ARF expects the facility to go critical next week.

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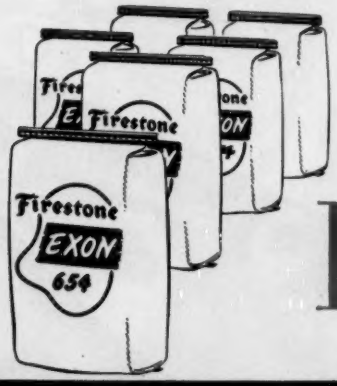

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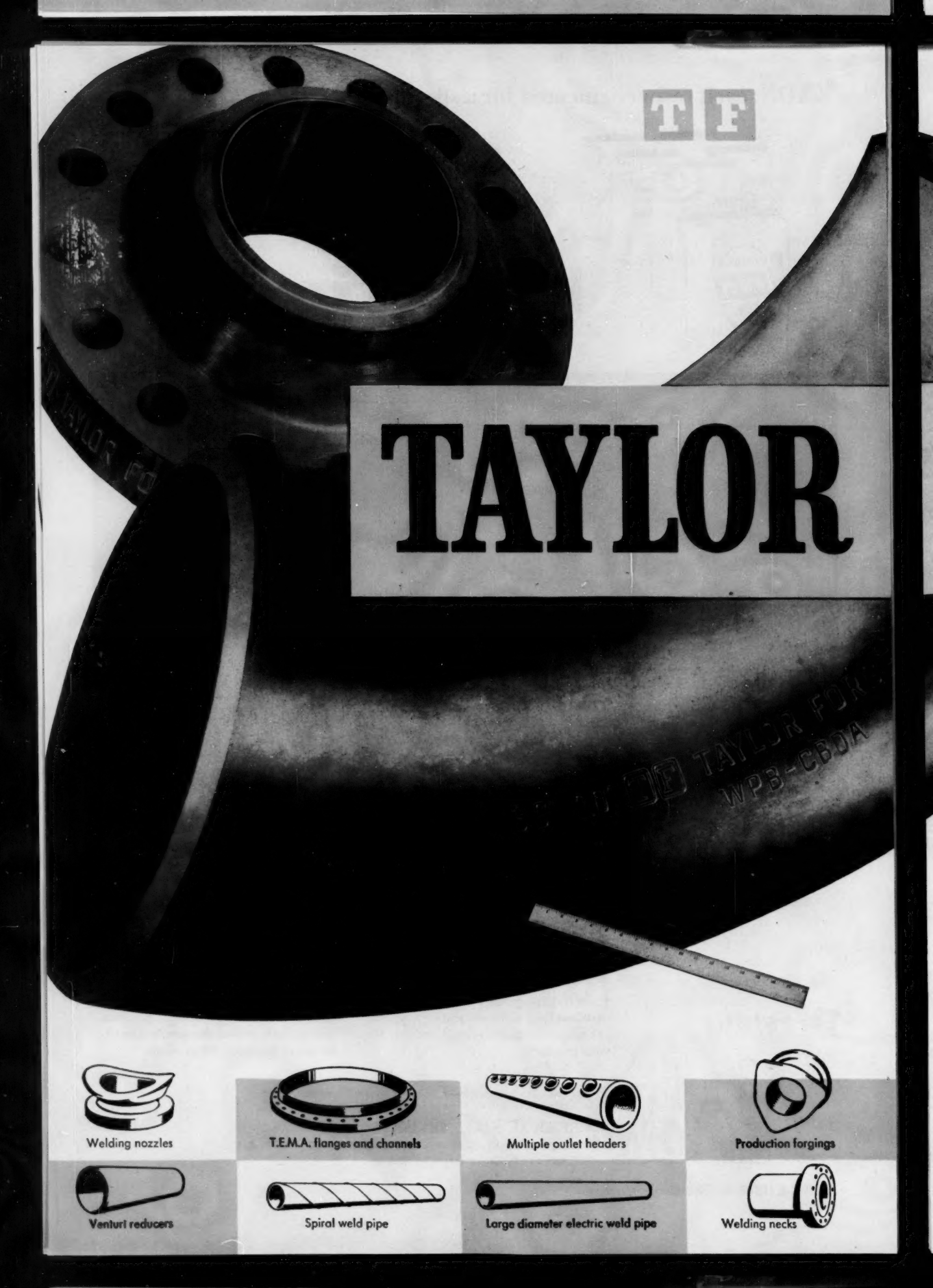
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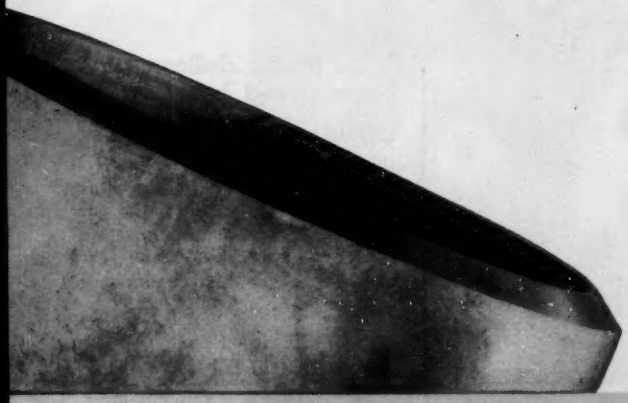

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'. . . the transportation department,' says Stauffer's John Carlson, 'can be a continuing source of saving and profit if you give it a voice in management . . .'

Give Traffic a Freer Rein

The profit potential in nonsales departments is increasingly being realized by chemical management. But the traffic department, for one reason or another, say its managers, has been too often overlooked.

Arguing the case: John Carlson, director of transportation for Stauffer Chemical Co., a man who keeps tabs on an $18-million/year traffic bill, and is supervisor of a department with authority and a recognized voice in company management. It's time, says Carlson, for top chemical management to take on a new partner (the traffic manager), turn him loose, and see what he can save.

"Traffic now," continues Carlson, "is a highly technical field requiring highly trained specialists. It takes seven years alone to make a good freight-rate clerk. It just doesn't make sense not to get the most out of the research or production team. And it's equally short-sighted to let sales and production departments vie for control of the traffic department, whittle its authority, or automatically refuse funds for new equipment, buildings and manpower.

"Traffic can put money in the company pocket. In my own company in the past seven years, we've been able to save $250,000 each year—above and beyond that which was saved the previous year (*see box, above*).

"We've bought specially lined equipment to permit two-way haulage, switched to bulk movement, changed the mode of transportation, and even supervised ship unloading. And we've found that a great deal of money can be made by having traffic in on equipment design. Freight rates—especially in water and truck movement—are often based on the equipment design.

"The department can protect equipment investment. For example: we designed one barge so that it could be easily converted from sulfuric acid shipment to sulfur or granular chemical haulage.

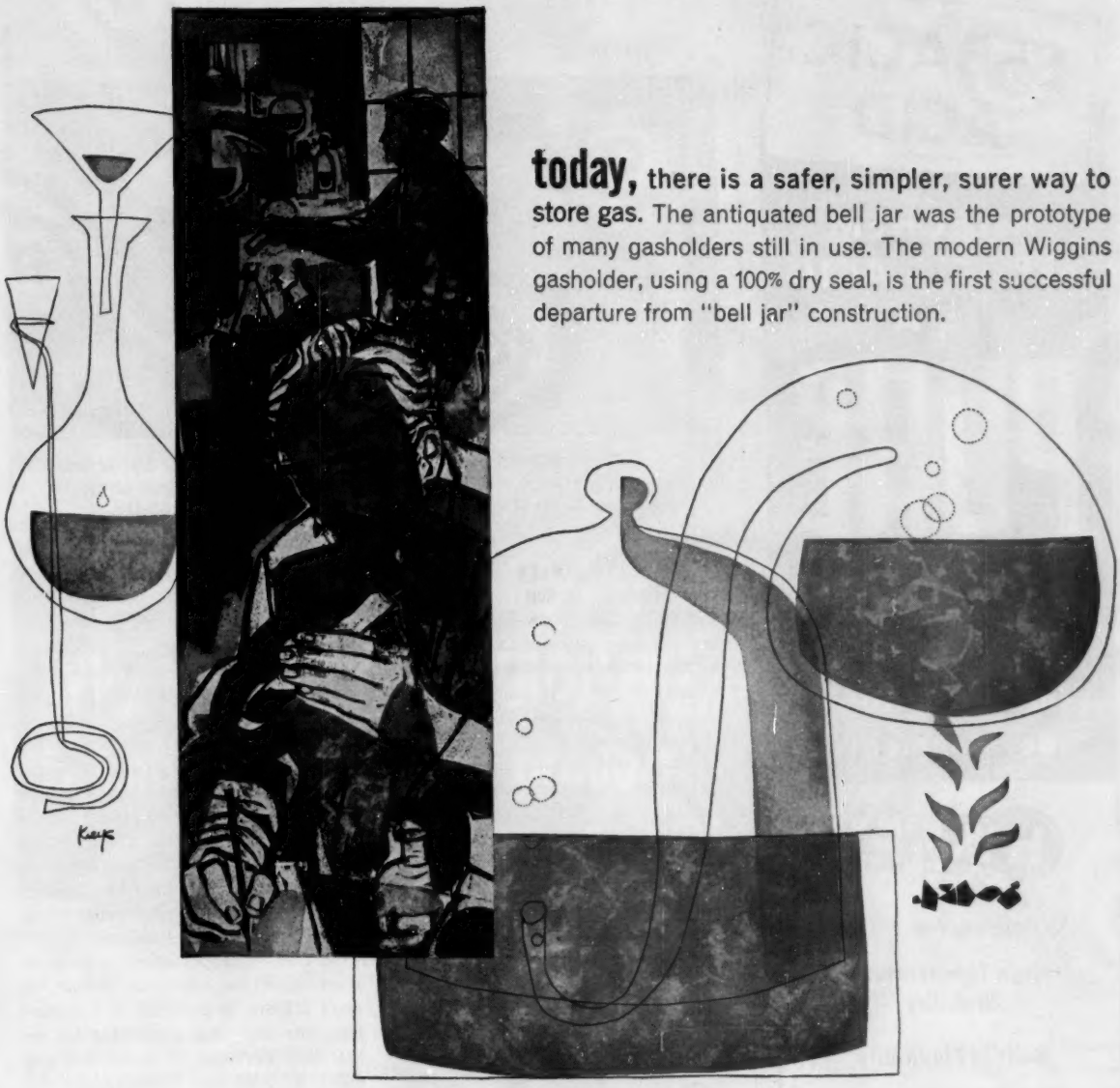
"Close traffic control and knowledge of equipment interchangeability can bring business to a company. On several occasions, such control and knowledge let us make a sale that otherwise would have gone to a competitor."

Free Hand: The potential of the traffic department can be realized, believes Carlson, only if it is made a full-fledged member of management. In too many companies, traffic is considered a mere clerical operation. To produce its product—efficient shipping—traffic should have equal status with sales, purchasing and other corporate functions. Spelling out the details, Carlson offers these suggestions to the company seeking maximum return from its traffic dollar:

- The traffic department should have complete charge of all material transportation, including its equipment.

'. . . traffic dollars have been saved by . . .'

- Establishing centralized pools of interchangeable tank cars and trucks, and carefully allocating them. Plants need not have cars available to handle maximum output. In emergencies, tank cars can be shunted to alternate plants. First year's savings: $50,000.
- Diversion of a raw material movement from rail only to water and rail. Savings: $90,000/year.
- Using sea shipment of chemicals from coast to coast with stops en route. Savings: $70,000.
- Changing the physical distribution of one chemical from bags to bulk delivery. First year's savings due to rate reductions: $48,000.
- Installing a sight draft system for close control of freight bills and specifying route and rate before forwarding documents. Postauditing and other savings: as high as $20,000/year.
- Obtaining specialized equipment, changing material handling to larger bulk quantities, and constructing specialized storage facilities. Savings: $300,000/year.
- Switching to Liberty ships (in one case) and setting up terminal storage. This was cheaper because large cargoes could be used. Savings: $100,000/year.



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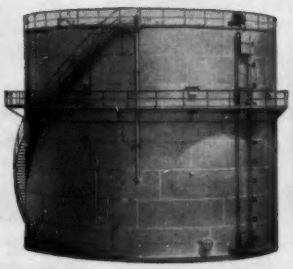

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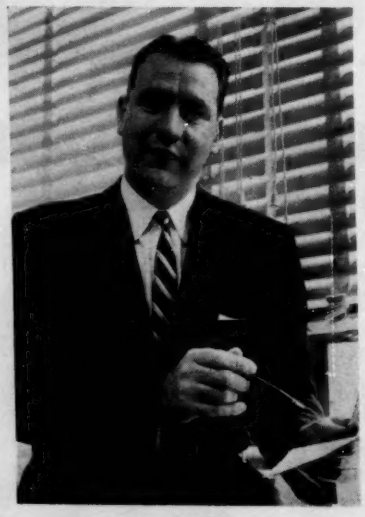
Story begins on p. 76

'Specialized equipment can often pare costs. By designing a truck to tote liquid alum eastbound, and paper or grain westbound, an 89¢/100 lb. charge was cut to 44¢/100 lbs. . . '

• The traffic director should report to management at a level of organization that places him on a par with other departments in the company. Reporting to another department, traffic is likely to please its immediate masters, rather than work for over-all corporate good.

• The traffic department (especially its control) should be centralized and responsible for all divisions. It's impossible for the department to bargain for a reduced rate if it can offer a carrier only the limited business of one division. And centralization is a must for efficient use of equipment pools (*see box*).



'. . . centralized traffic control is essential for top-flight efficiency. . .'

• The traffic department should be called in early on decisions involving a new plant, a new supplier, or a new, large-volume customer. "Carriers are reluctant to give a lower rate, once movement at a higher tariff has been established."

• Clerical routine should not burden the department. It is grossly inefficient to inundate skilled, technical people with "rate figuring and routing for individual orders once the traffic pattern has been established." Similarly, plant traffic personnel shouldn't be burdened with shipping department paper work, such as bill of lading handling.

• The transportation operation must have an adequate budget. It can't achieve its potential if it doesn't have the staff and equipment for research, supervision of equipment use, etc.

• The traffic department must be judged on results of its performance. This includes routine service functions as well as savings through new ways of shipment.

• Top-notch personnel must comprise the staff. Ideally, the men should have a technical traffic background, thoroughly understand the company's business, be versed in good business management, and be salesmen extraordinary (to sell carriers on rate reductions).

With such a policy, asserts Carlson, a chemical company can add traffic to the roster of profit-making departments. And it's almost a sure bet to improve the functioning of many non-traffic departments as well. At least that's been Stauffer's experience.

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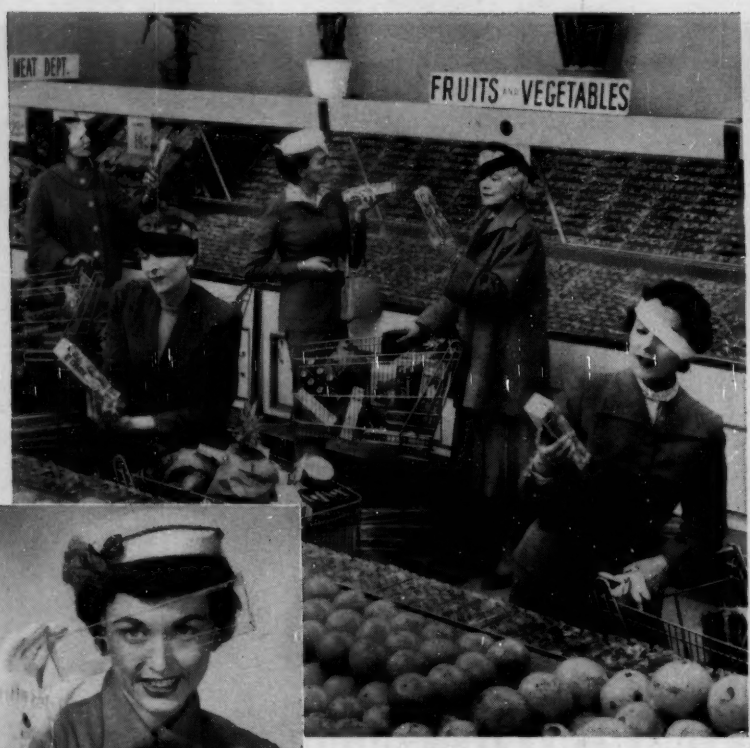

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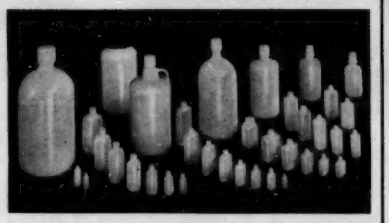
Now such perishables as meats and tomatoes are shedding "half-hiding" containers and slipping into trays of crystal-clear Polyflex. This tough plastic is odorless, tasteless, safe in direct contact with foods. It lets quality show "all over" while protecting contents in sturdy, semi-rigid trays, cartons, boxes or lids.



More than ever "squeeze" bottles by Plax lead the packaging parade. New, improved dispensing fitments, widest variety of stock bottle designs, unequalled facilities for meeting custom packaging needs make Plax the most logical source for plastic bottle packaging.

New Lined Plax Bottle (right) holds fluids that deform ordinary squeeze bottle.

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Heavy-duty, stackable 16-gal. plastic carboy-drum will be made by Plax to design originated in Italy by Montecatini and Pirelli. (Patents applied for.)

DISTRIBUTION. . . .

DATA DIGEST

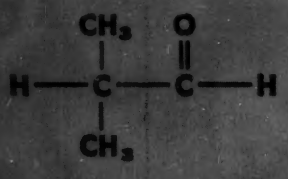
• **n-Hexanol:** Data sheet gives physical and toxicological properties, specifications, resin solubility, and constant boiling mixture data, and proposes use as hormone extracter, solvent, and insect repellent base, and in hexyl group introduction. Carbide and Carbon Chemicals Co. (New York).

• **Molybdenum chemicals:** Bulletin catalogs company literature, gives brief description of brochures available. Climax Molybdenum Co. (New York).

• **Silicone mold release agents:** Leaflet sketches use of silicone mold release agents in rubber processing. Silicone Products Dept. General Electric Co. (Waterford, N.Y.).

King-Size Container

SPECIAL material handling problems inevitably take special containers. Case in point: these elongated cylinders of polyethylene. They've been especially designed to hold corrosive radioactive materials, and are claimed to be cleanable with 99% decontamination. Measuring 53 in. long over-all, the bottles have a 4.75-in. outside diameter and a 3/16-in. wall. Manufacturer: American Agile Corp. (Maple Heights, O.).



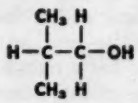
Isobutyraldehyde

Specifications	Technical Grade	C. P. Grade
Color, A.P.H.A. *(platinum-cobalt standard)*	10 p.p.m. max.	10 p.p.m. max.
Specific Gravity, 20°/20°C.	0.789-0.799	0.786-0.790
Isobutyraldehyde by distillation	95.5% min.	
Turbidity *(fuller's earth standard)*		1 A.P.H.A. unit max.
Isobutyraldehyde by titration	95.5% min.	97% min.
Boiling Range		95% between 62°-67°C.
Water	3.0% max.	0.5% max.
Acidity, as isobutyric acid	0.35% max.	0.35% max.
Ash	0.0015% max.	0.0013%

isobutyraldehyde

...a versatile building block

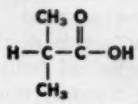
Commercially Available Derivatives



Isobutyl alcohol

Reduction product of isobutyraldehyde

Color, A.P.H.A. *(platinum-cobalt standard)*	5 p.p.m. Max.
Specific Gravity, 20°/20°C.	0.80210-0.80444
Assay, by weight	99.0% Min.
Nonvolatile	0.005 gram per 100 ml. sample min.
Acidity, as acetic acid	0.005% Max.
Water	0.2% Max.
Boiling Range	
Initial	106.0°C.
Dry	109.0°C.
Carbonyl	0.07% Max.

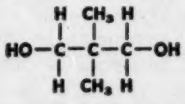


isobutyric acid

Oxidation product of isobutyraldehyde

Color, A.P.H.A. *(platinum-cobalt standard)*	10 p.p.m. Max.
Specific Gravity, 20°/20°C.	0.946-0.951
Assay	99.0% Min.
Water	0.10% Max.
Reducing Substances	3.0 ml. 0.1 N $KMnO_4$ per 2 ml. sample min.
Boiling Range	
Initial	150°C.
Dry	157°C.

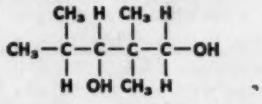
Available Pilot Plant Derivatives



neopentyl glycol

Reduced condensation product of isobutyraldehyde and formaldehyde

Form	Crystalline solid
Color	White
Melting Point	124°-130°C.
Purity	96% minimum



2, 2, 4-trimethyl-1, 3-pentanediol

Reduced condensation product of isobutyraldehyde

Form	Crystalline solid
Color	White
Melting Point	49°-51°C.
Purity	95% minimum

Eastman isobutyraldehyde is a new commercially available chemical building block supplied in both C. P. and technical grades. C. P. isobutyraldehyde, an essentially anhydrous material, is primarily intended for use in the manufacture of fine chemicals such as pharmaceuticals. It is available in carload drum quantities. The technical grade of isobutyraldehyde is intended for applications where extremely high purity is not essential. This grade is available in tank car quantities.

Produced by the oxonation of propylene, this versatile aldehyde can be used to produce many interesting chemicals. Among the derivatives already available in commercial quantities are isobutyl alcohol and isobutyric acid. Neopentyl glycol and 2,2,4-trimethyl-1,3-pentanediol are presently available in pilot plant quantities and are expected to be in commercial production during 1956. These isobutyraldehyde derivatives are useful in themselves or as starting materials in the production of solvents; plasticizers, pharmaceuticals, polymer intermediates, resins, insecticides, hydraulic fluids and lubricants.

If you are interested in isobutyraldehyde itself, or in any of the available derivatives we will be glad to send you samples so that you may evaluate their possible place in your production picture.

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SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tenn.; New York, N.Y.; Framingham, Mass.; Cincinnati; Cleveland; Chicago; St. Louis; Houston. **West Coast: Wilson Meyer Co.,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

The 10,058 U.S. farm co-ops:

- have a membership (1954) of 7.6 million* (doubled since 1940, up 2% since '53).
- represent farmer investments of $3 billion (up $1 billion since 1950).
- operate 120 fertilizer plants (up from 50 in '45, 100 in '51, 106 in '53).
- distribute 25% of U.S. fertilizers, 14% of pesticides, 7% of agricultural pharmaceuticals, 2% of all petroleum products.
- manufacture 22.5% of U.S. fertilizers, 25% of all feeds, 1% of all petroleum products.

*Includes duplication; 80% of 5 million U.S. farmers belong to co-ops.

Coping with Co-ops

"The fertilizer business has gone to the dogs, and the co-ops are responsible. They've got half the business, and we've got half, and nobody is making any money. I would not even guess the outcome. Everyone who has had any dealings with them is scared to death of co-ops. But they cannot be ignored. They're legal, they're here, and we can't beat them . . ."

This comment—strong as it is—sums up what most fertilizer manufacturers and distributors who are not members of farm co-operatives tell you when you question them about the co-ops. To get industry's reaction to latest co-op developments (*CW, March 3*), *CW* editors asked major fertilizer producers and distributors what they're doing to meet this fast-growing competition. Consensus: you can't do much—it's not a problem that can be whipped on the production, marketing or distribution levels, it's one that's going to demand legislative action—and fast.

Changed Concept: A vice-president of a major fertilizer producing company had this to say: "Agriculture was a particularly susceptible field for the enormous spread of the co-ops movement. They were first organized to dispose of farm crops in an orderly manner and to protect the farmer. There was no concept in the original plan that the co-ops should become industrialists.

"But as they began to amass money with which they could expand their operations, they also began to realize their terrific power; it was apparent that their freedom from taxes gave them an enormous advantage.

"A company like ours pays 52¢ in taxes out of every dollar it takes in. And the co-operatives' tax-free operation puts us in a helpless position. They grow where we can't, because they can plow their profits back, tax-free. And these days, they're expanding into the big money field. . . . They can put $15-20 million of tax-free money into a fertilizer plant.

"We were outstanding in developing high-analysis, pelletized fertilizer. We had done long research, worked hard, made money and put it back into expansion. But the co-ops put their tax-free profits back into their business; soon they were big and powerful, and now the whole fertilizer field is completely confused. It's going to throw people out of jobs, and it's going to wreck us."

Save on Freight: A Northwest fertilizer plant manager had this to say: "A look at how the co-ops got into the act will show you what private industry's up against. In the Northwest, private industry spent considerable research and development time, bought a lot of expensive equipment with a high rate of obsolescence, and built up a market for ammonia.

"Trouble began when farmers began vacationing in Florida. They took a look at Louisiana, Mississippi and Georgia on the way, and started asking questions. Seems there was quite a difference between price of "cotton" ammonia and "wheat" ammonia, much of it due to freight bill ($40-50/ton in the Northwest, $5-15 on the Gulf Coast). Logic dictated a local plant to produce ammonia.

"How long is industry going to be interested in developing and promoting new products, and spending their research money in anticipation of having market to an organized group that is large enough and financially strong enough, due to retention of earnings provision in the co-op law, to set up their own production—without spending for market and process development?

"The great weakness of the co-op is that without the profit system and its inherent, boldly stated incentives for individuals as well as stockholders, it is difficult to attract and hold ambitious and imaginative individuals—those anxious to provide the services a customer has a right to expect, those willing to initiate research and development of new products and methods."

Are Taxes Paid? Similar comments—with only slight variation—were heard time and again by *CW* interviewers. A Southern chemical company's vice-president said, "Allowing the co-ops to operate as they do now is about as close to communism as you can get." He also believes that no taxes are paid by anyone profiting from co-op sales, i.e., the individual farmer. As he put it, "Let's say it costs the co-ops $100 to make a ton of fertilizer. They sell it for $125, and make a 25% profit that they pay back to their customers in dividends. Of course the 'customers' are supposed to report the 'dividend'—but what do you think?" Summing up, he admitted that private enterprise is partly to blame for the situation, because of its lack of interest in taking steps to curb tax advantages given to co-ops. "Private enterprise just hasn't made up its mind to lick the problem—but it will have to, sooner or later."

From the manager of one of the country's fertilizer works came this comment: "What can a company do to fight a group that already has a big financial advantage?"—referring, of course, to the co-ops' tax exemption. In his opinion, "co-op products

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Have You An Odor Problem?

Excerpts from monthly news bulletin sent by RHODIA to its sales and engineering staffs.

AMMONIUM THIOGLYCOLATES

Recent developments abroad indicate that three ALAMASK products are excellent for reducing odor intensity and masking ammonium thioglycolates. Potential users can submit their products for evaluation and reodorization. After tests, recommended formulae will be submitted.

AMMONIA and FORMALDEHYDE

ALAMASK CNG and ALAMASK CNG-X have been reported to us as excellent masking agents for odors traceable to ammonia and formaldehyde. ALAMASK CNG-X will give clear solutions in dilute aqueous ammonia and is generally employed at concentrations of 0.5% to 3%, depending upon the masking requirements.

REFUSE AND WASTES

ALAMASK CNG has also been recommended for use in controlling malodor from refuse dumps and animal wastes. This product imparts a fresh clean fragrance.

These are but a few of the instances where ALAMASK is being used to combat obnoxious malodors, whether they be from processing operations or in end product. Our technical staff is available to work with you on your odor problems.

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are as good as anyone's, so price becomes the thing. With their tax boon they naturally can sell cheaper."

What can be done to correct the situation? Like most, he is pessimistic: "Co-ops are extremely powerful and exert great political pressure. What chance have we of changing the picture now?"

What to Do? Some suggestions from another fertilizer producer: "What to do about the co-ops? Well, I keep on dreaming about new ways to develop better sales techniques. . . One of the things that will help us survive is to put merchants in a position to continue to buy. Local people in farming areas depend on merchants. The average farm consumer doesn't use so much fertilizer that the kickback from the co-ops matters a great deal to him. We might as well write the big planter off, because he is in a position to use the situation to his advantage as a big consumer. But there are still a lot of smaller customers that we can sell. Still, it's a tough job to offset the kind of underselling that the co-ops do.

"I'd say our greatest need in the industry is more emphasis on public relations, at every level. We need to train whole organizations from top to bottom to get the free-enterprise story over in every contact made by every individual. We must do it on a man-to-man basis, talking it every day, to try to make people realize why private enterprise must be left free to function in a free economy.

"Within our company, we're working hard on new products, trying to keep our head start, in the hope that it will at least be a long time before they can catch up with us in research. We try to be smarter than they are, more astute, more alert. We try to sell harder. . . There are some lines of business, like cotton oil mills, that can keep their fertilizer production as a side line, and they can operate, without being hurt too badly, by concentrating on other lines. But everyone who has anything to do with fertilizer is getting hurt these days."

Education Needed: Awaking the farmer to an awareness of his own situation is an oft-suggested solution of the poser. "Many a businessman," one fertilizer producer said, "who wouldn't dream of endorsing socialism is tempted by phony co-op promises. They offer a price list that's theoretically similar to ours, then tell the customer that at the end of the year he will get a profit—say $100—on each order of a certain size. The farmer takes the bait because he doesn't realize what the deal is, and at the end of the year he gets scrip instead of cash; in fact, one of the reasons we can survive these days is because the co-ops pay him in scrip.

"I've seen price lists," he continued, "where co-ops sell to the farmer at lower prices than we sell to dealers. But they can still parlay their operations from a small beginning into a powerful organization because of their tax advantage. They misrepresent the market, say more plants are needed, make expansion sound good to the farmer. You keep hearing that more plants are needed—but ours could handle two or three times the business we're getting. Now some co-ops are beginning to realize they have overexpanded.

"I don't fall out with the co-ops; I talk with them as I go around the country; I have to know what's going on. But this co-op movement is bigger, potentially more dangerous, than many people realize."

Coexistence: Most of those who were interviewed feel that there is a place in the economy for both co-ops and non-co-ops—if tax inequities are righted.

At present, there is a bill before the House Ways & Means Committee that would reduce tax exemptions of cooperatives. But this bill is gathering dust* and isn't going to go anywhere, according to Washington observers. It's been introduced by Rep. Clifford Davis (D., Tenn.) in the last three sessions without making much of a dent, and is looked on more as a political gesture for the record than as a serious attempt at legislation.

Even if Congress does stir enough to look at the situation, there will be plenty of hurdles ahead of the bill. Among them: strong farm lobbies, Secretary Benson's pro-co-op outlook ("I sincerely hope to see the cooperative movement vastly strengthened in America"), "public indifference and misinformation."

A real battle is shaping up—maybe not this year—but it's coming. And it's sure to be a no-holds-barred affair.

*Bill was referred to House Ways & Means on January 16, 1956. Committee hasn't yet taken it out of basket to see whether they want to consider holding hearings on it.

ATLAS chem-memos

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When you're looking for *savings* on alkyd resin formulations... the kind of savings that will give you opportunities for improvement... then you should take a good look at what *sorbitol* can do in combination with glycerol or P.E.

Here's a guide formula for a resin you might try in economical four-hour enamels; structural and machine primers and enamels; automotive finishes and maintenance paints—for use where fast dry and durability are important. It also makes an excellent grinding liquid.

Linseed Oil	346
Soya Oil	186
Phthalic Anhydride	312
Maleic Anhydride	4
SORBITOL (Dry Basis)	103
Glycerol (Dry Basis)	103
Litharge	0.5
Total	1054
Yield	1000

PROCEDURE: (1) Charge oils and glycerol and heat to 235-240°C. (add litharge at 190°C.). (2) Hold ¼ hour, add SORBITOL followed by phthalic and maleic. (3) Raise temperature to 235-240°C. and react to desired acid number and viscosity.

This alkyd is suitable for either air-dry or baking, and is especially recommended for colored finishes (not highest quality whites). Our laboratory evaluation shows much faster drying to tack-free condition than a similar resin based on 100% glycerol. It has excellent brushing characteristics, gives films of outstanding gloss.

Sorbitol's price is low and has never gone in any direction except DOWN. For typical sorbitol resin formulas, and characteristics, write for the booklet, "Sorbitol Resins."

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Ayerst Laboratories, Inc.	Nutritional Compounds
Block Drug Company, Inc.	"Amm-i-dent" Ammoniated Toothpaste
	"Green Mint" Mouth Wash
Bristol-Myers Company	"Ban" Lotion Deodorant
Lambert-Hudnut Division, Warner-Lambert Pharmaceutical Company	"Listerine" Toothpaste
Mennen Company, The	"Hair Creme" for Men
Norwich Pharmacal Company	"Unguentine"
Pacquin, Inc.	"Silk 'n Satin" Lotion
	Hand Creams
Schering Corporation	"Coricidin" Cough Syrup
Tussy Cosmetiques	"Tussy" Creams and Lotions
U.S. Vitamin Corporation	"Vi-syneral" Vitamin Drops
Upjohn Company, The	"Kaopectate" with Neomycin
Wallace & Tiernan Inc., Maltbie Laboratories Div.	"Desenex" Ointment
Westwood Pharmaceuticals	"Lowila" Skin Cleanser
Wildroot Company, Inc.	"Wildroot" Cream-Oil Hair Tonic

WASHING AND IRONING AID

Atlas is offering to specialty compounders a new formula for a water-soluble ironing aid, which, in addition to making the iron slip easily over clothes, gives laundry a soft finish. The composition would not discolor or deteriorate the fabric, and would not "build-up" in fabrics over a long series of washings. Applied in the last laundering rinse, it would be removed the next time the garment is washed, and actually assist in cleaning the garment.

The formula is:

Atlas G-1300 polyoxyethylene fatty glyceride	4.5%
CMC	3.0%
Water (optional)	92.5%

The Atlas product, G-1300, is a soluble wax which gives the composition its "slip." Atlas does not make or supply CMC.

The ironing aid is covered by U. S. Patent 2,645,584. Atlas will gladly work with you on licensing details.

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DISTRIBUTION. . . .

Reinforcer for Sales

Reinforced-plastics makers got a heavy dose of advice recently on how to win a bigger share of the defense market for containers and materials handling equipment. The word was conveyed by a panel of government speakers at a day-long technical conference sponsored by the Business & Defense Services Administration.

The 800 industry technicians who converged on Washington for the meeting came away with this picture of the sales outlook:

There's a huge market in servicing the military's needs. By September, the Defense Dept. will have completed a new cataloging program, listing specifications for some 3 million different items bought by the services. All will require packaging. The Army, Navy and Air Force are actively experimenting with reinforced plastics—mainly strengthened with glass fibers—to improve and lower the costs of packaging and handling these items.

Glass fibers have already found a small place as an acceptable reinforcer for plastic packaging material, being used in containers for Air Force photographic equipment, some guided missiles components, helicopter rotor blades.

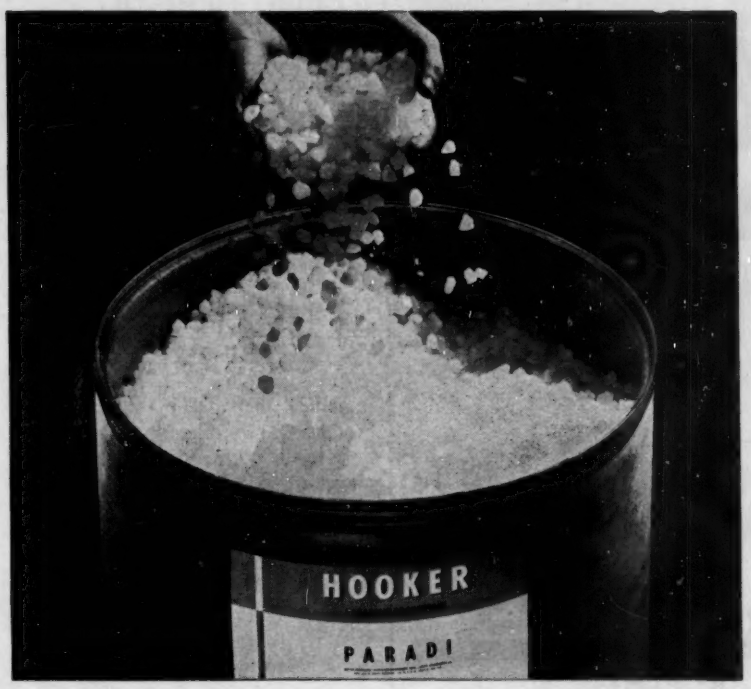
Defects: But glass-fiber-reinforced plastics have also fallen down in trials as a pallet for handling equipment in flight. Major Henry I. Lipsie, USAF, reported that such pallets chipped in use, and that packages slid off their smooth surface during air transport.

Lipsie highlighted several problem areas facing makers of glass-reinforced plastics before they can make a major breakthrough on winning military business. Too many designers, he said, have followed conventional designs of metal fabricators, and are not taking advantage of the strong points of glass-reinforced plastics.

The Air Force, he complained, has seen too many cases of resin separating from laminates, skimpily applied resin, and faulty sealing around metal parts inserted in the plastic.

But, the big problem is price. The basic cost per pound of a finished steel container, Major Lipsie reported, is "much less" than for glass-reinforced plastic containers. Aluminum enjoys this price advantage, too, but to a lesser degree.

"Since the savings in weight and maintenance have never been of the



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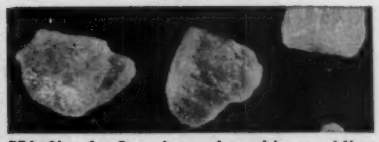
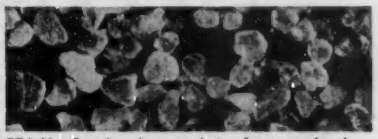
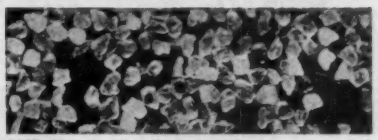
Seeing is believing . . . Now is the time to plan for sales sparkle in your products—with PARADI. Check the seven convenient crystal sizes shown here, and order a trial quantity of PARADI today.



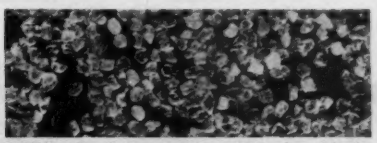
PEA No. 1—Repackage these big sparkling crystals, just as they come from the drum.



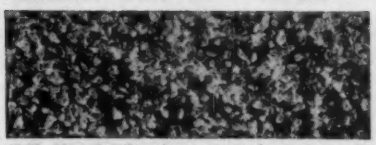
PEA No. 2—Another good size for repackaging.



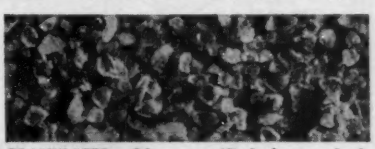
RICE No. 1—Smallest crystals recommended for straight repackaging. Many housewives prefer this finer size.



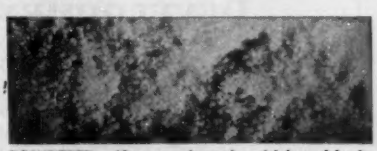
RICE No. 2—For power compressing into blocks and pellets. Exceptionally free-flowing for automatic presses where dies must be refilled rapidly.



RICE No. 3—For foot-operated presses you need a finer size like this, free-flowing but small enough to pack and compress easily.



GRANULATED—Often specified for agricultural use.



POWDERED—If you melt-and-mold into blocks or pellets, you'll save the most time with this superfine fast-melting size.

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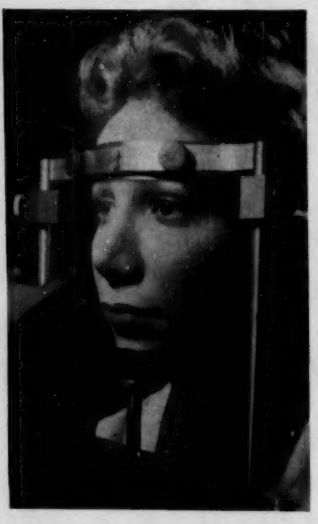
degree expected," he warned, "the future of plastics gets right back to the cost of the container. The resin suppliers, fabricators and designers must be able to reduce the cost of containers to well within shouting distance of conventional metal containers."

The National Bureau of Standards' James R. Miles suggested that the industry go about doing this by pooling their efforts "in some type of institute or foundation to determine the properties and proper methods" of making glass-reinforced plastic products. He suggested that the plastic materials producers also take some action to disseminate proper information on applications to fabricators, and discourage excessive claims on behalf of their products; give fabricators proper specifications and see that these are followed; give technical aid to fabricators falling behind on quality or delivery.



Catch Eye, Catch Sale

PACKAGING dollars go farther when the cartons they buy make the shopper stop and read. Packaging research, sponsored by the Folding Box Assn., is studying what catches a customer's eye (*above*). From eye-movement measurements, and other studies, the group hopes to find the essential features of eye-arresting and sales-making design.

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

Three Methods of Measuring Salt—and Their Effects on Brine Uniformity

One of the most important factors in maintaining brine strength at consistently uniform levels is salt measurement. When measurement is inaccurate, brine may be weakened excessively or become too strong. But, when salt is measured accurately, variations in brine strength are virtually eliminated . . . brine production costs are reduced . . . and product quality remains high.

Today, there are three methods commonly used to measure salt in industry. While all of these have certain merits, only one method is completely accurate—measuring salt quantity in the form of saturated brine. A look at the other two methods will show why they are not entirely reliable.

Measurement by dry salt volume. This method presents a number of difficulties. First, moisture content of salt can greatly affect its volume. And humidity changes alter this moisture content to a considerable degree. Degree of compaction makes a big difference in volume, too. A pailful of salt

may vary from 25 to 35 lb. (a 40% margin of error) depending on storage conditions, or length of storage. Both moisture content and compaction will change, not only from one day to the next—but also from one batch of salt to another.

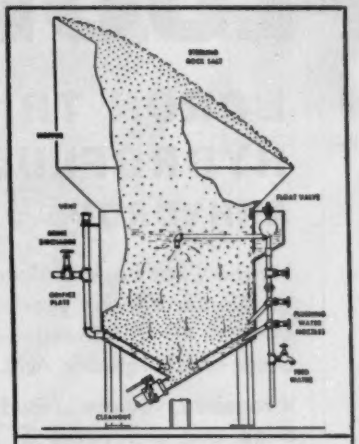
Measuring by dry salt weight. This method is somewhat more reliable, but is still far from accurate. When the scale reads 100 lb., it can never be estimated how much of that weight is

moisture—one pound or ten. And again, the moisture content of salt varies constantly with air humidity, and humidity of storage areas. When salt is measured this way, control over brine strength is never exact.

Measurement by the saturated brine method. This is effective in every industrial application. It depends, of course, on fully saturated, crystal-clear brine, free from any undissolved solids. One gallon of such brine always contains 2.65 lb. of salt (if dissolution water temperature is within the range found in most plants). By starting with this accurate fixed unit of salt measurement, brine strength can be completely controlled. Whatever strength is desired—the dilution of fully saturated brine with a certain amount of water produces it quickly and accurately.

One of the best ways to get the fully saturated brine essential to this measuring method is with a Lixate Rock Salt dissolver. This device—originated by International—automatically produces clear, fully saturated brine from Sterling Rock Salt. In fact, development of the Lixator made possible accurate salt measurement.

Regulating brine strength with the Lixator: Water is run into storage tank up to a specified mark. Lixate Brine is then added to bring the volume up to another mark. The mixture of water and Lixate Brine will give the exact strength of dilute brine needed—as well as the correct volume.



The Sterling Lixator reduces salt-handling, brine-making and brine-distributing costs. Savings between 10% and 20% on salt used are possible, too.

This method of salt measurement and brine control, of course, does more than protect product quality. It also provides substantial savings in time and labor—since the entire Sterling Lixator operation is fully automatic.

TECHNICAL SERVICE WITH YOUR SALT

Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt you use. International produces both Sterling Evaporated and Sterling Rock Salt in all grades. We also make automatic dissolvers in metal or plastic for both types of salt. So we can suggest the type and grade of salt most perfectly suited to your needs.

If you'd like help on any problem concerning salt or brine—or further information on salt measurement—contact your nearest International sales office.

International Salt Co., Scranton, Pa.
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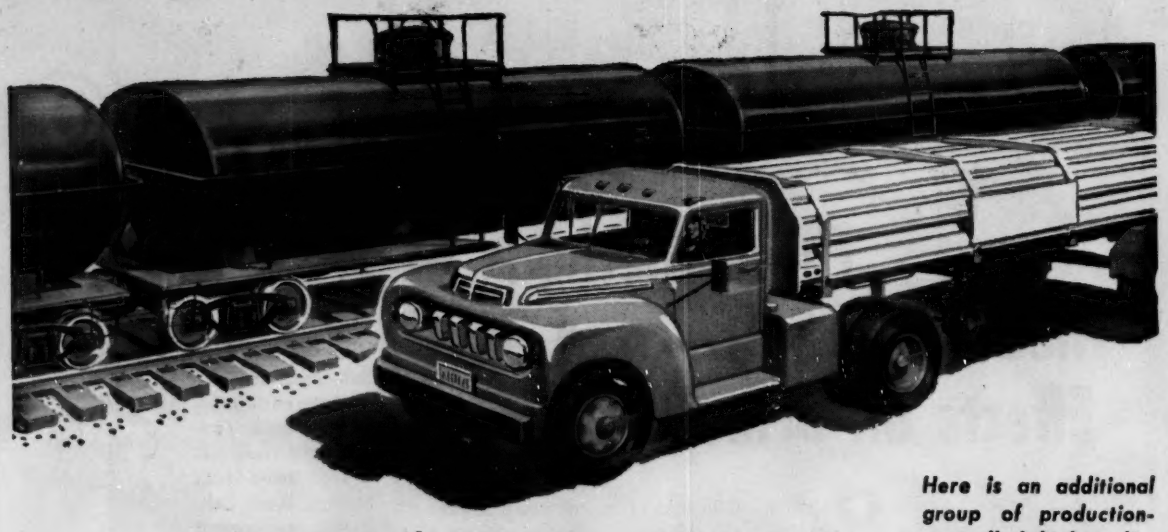

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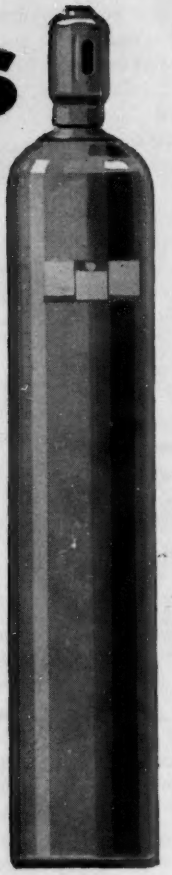

Here is an additional group of production-controlled, high-quality fluorides:

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Boron Trifluoride
Boron Trifluoride Complexes
Chromium Fluoride
Copper Fluoborate
Fluoboric Acid
Fluorine Cells
Fluorinating Agents
Frosting Mixtures
Hydrofluoric Acid Anhydrous
Hydrofluoric Acid Aqueous
Hydrofluosilicic Acid
Lead Fluoborate
Metallic Fluoborates
Potassium Bifluoride
Potassium Chromium Fluoride
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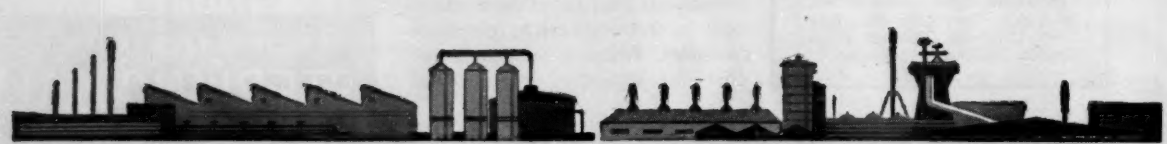
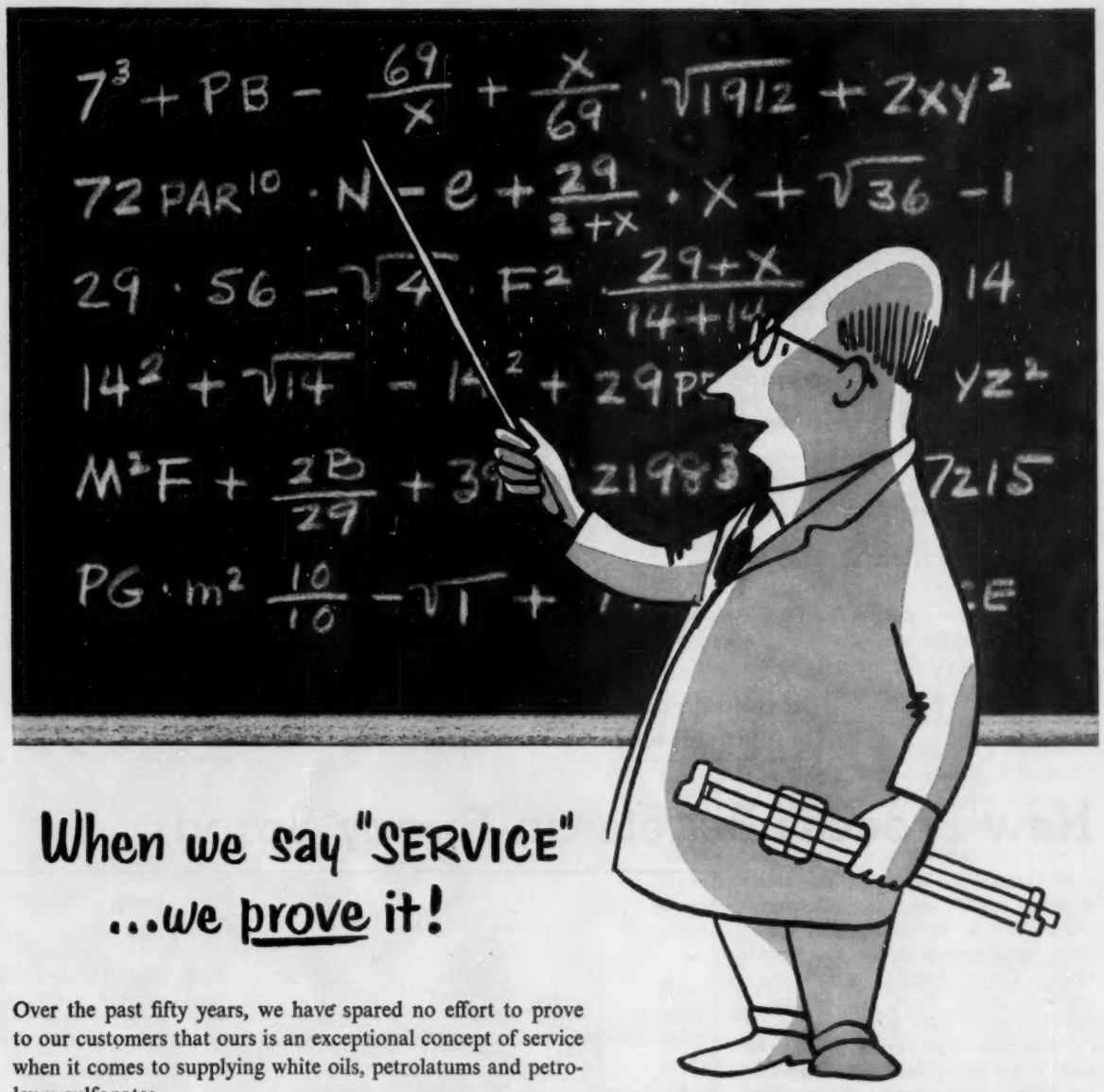
Sodium Fluoborate
Tin Fluoborate
Zinc Fluoborate
Zinc Fluoride





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☐ "General Information on White Mineral Oils" I.R. Bulletin "A"

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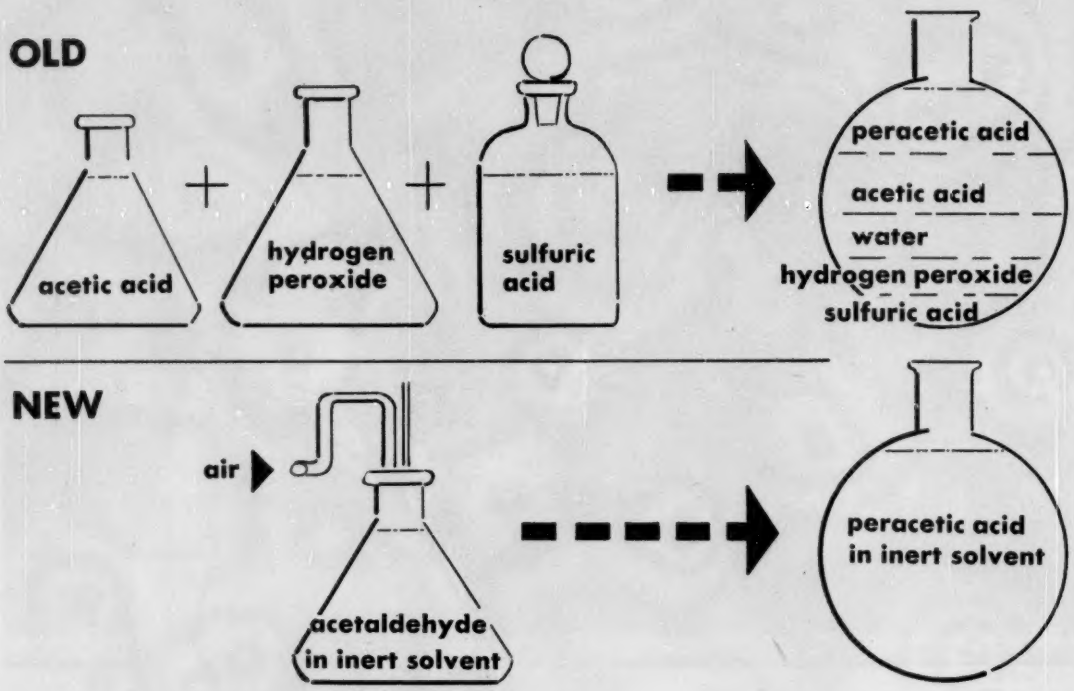


New Process Begets an Epoxy Brood

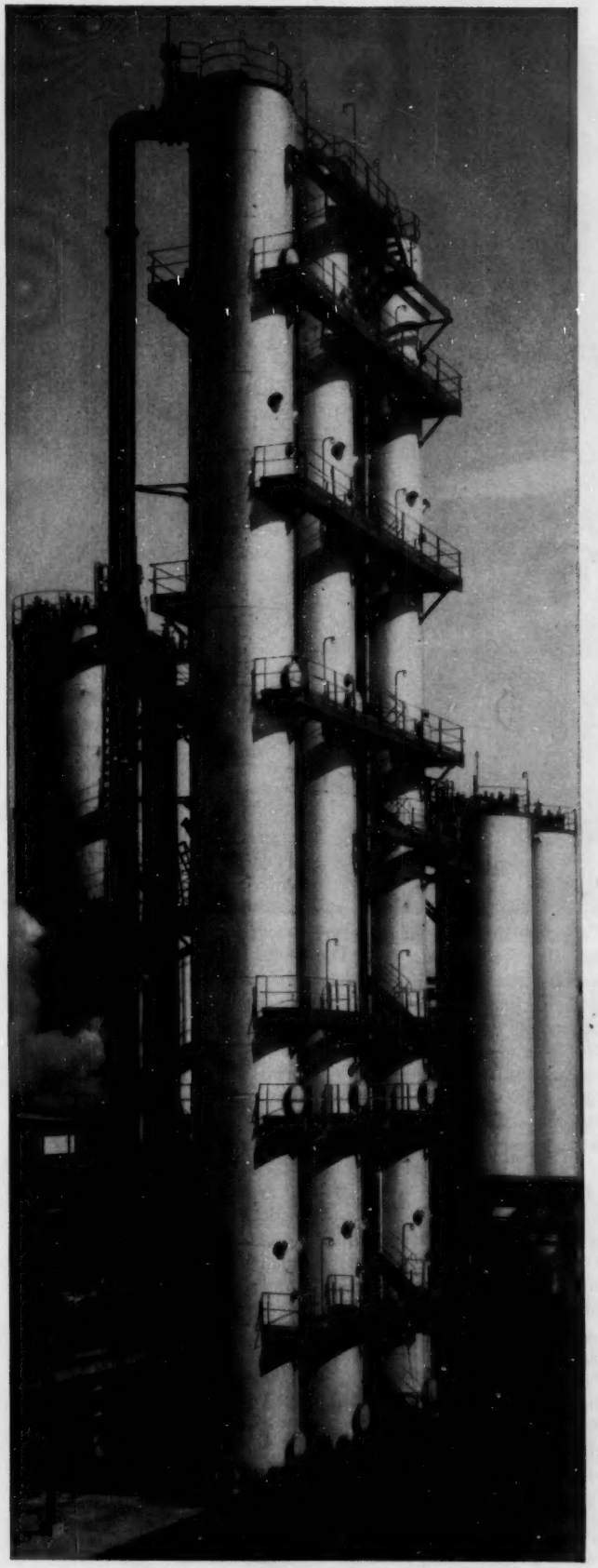
If Carbide has its way, the new peracetic acid process (*sketched above*) will be the most prolific producer of chemicals it has had since George Curme found how to make ethylene oxide from natural gas. Peracetic acid yield by the process, Carbide feels, will permit the insertion of the epoxy bond into a whole raft of unsaturated chemicals that have up to now eluded epoxidation by conventional techniques.

Eyes of Texas: The new synthesis and Carbide's high hopes for the new products (*right*) are being formally unveiled this week by the firm's Benjamin Phillips before the Dallas meeting of the American Chemical Society. Assistant director of research of Carbide and Carbon Chemicals, Phillips led the group that spent five years in developing the synthesis, probing products.

The process isn't commercial yet, but a peracetic pilot plant is in operation, and engineering is under way for a commercial unit. About all that Carbide will say about the big plant is that its natural product will be peracetic acid in an inert solvent. But

Some of the New Family

Product	Suggested use	Price range when available in commercial quantities
1,4-dichloro-2,3-epoxybutane	intermediate	50¢/lb.
1,2 disobutylene oxide	acid acceptor, intermediate	50¢/lb.
2,3 – disobutylene oxide	intermediate	50¢/lb.
EP-201 (3,4-epoxy-6-methylcyclohexylmethyl 3,4-epoxy-6-methylcyclohexanecarboxylate)	stabilizer for vinyl resins, epoxy monomer, cross-linking agent	50¢/lb.
styrene oxide	intermediate for phenyl ethanol (odorant) and epoxy resins; stabilizer; diluent for epoxy resins	50-75¢/lb.
2,2,3,3 tetramethyl butyraldehyde	odorant (similar to camphor)	
vinylcyclohexene dioxide	intermediate for resin	80¢-$1/lb.
vinylcyclohexene monoxide	resin intermediate	60-80¢/lb.
butadiene dioxide	cross-linking agent	$2/lb.



GRAVER

Gas and Chemical "scrubbers" for Great Lakes Steel

(DIVISION OF NATIONAL STEEL CORPORATION)

At Great Lakes Steel Corporation's Blast Furnace Division, a new by-product coke plant is equipped with a total of 25 large examples of Graver's craftsmanship in steel.

These structures, shop-fabricated at Graver's East Chicago plant and field-erected on the site by Graver crews, were built to the designs of Wilputte Coke Oven Division, Allied Chemical & Dye Corporation. These include bins, stacks, gas coolers, tanks for chemical feed, storage, and settling—and scrubbers such as the three 132′ towers shown at the left.

This variety of quality fabrication indicates Graver's versatile craftsmanship—demonstrates Graver's ability to shop-fabricate and field-erect structures for the steel, petroleum and chemical industries. For process and storage equipment in steels, alloys or clads, Graver's offices across the country are staffed with competent engineers ready to serve you.

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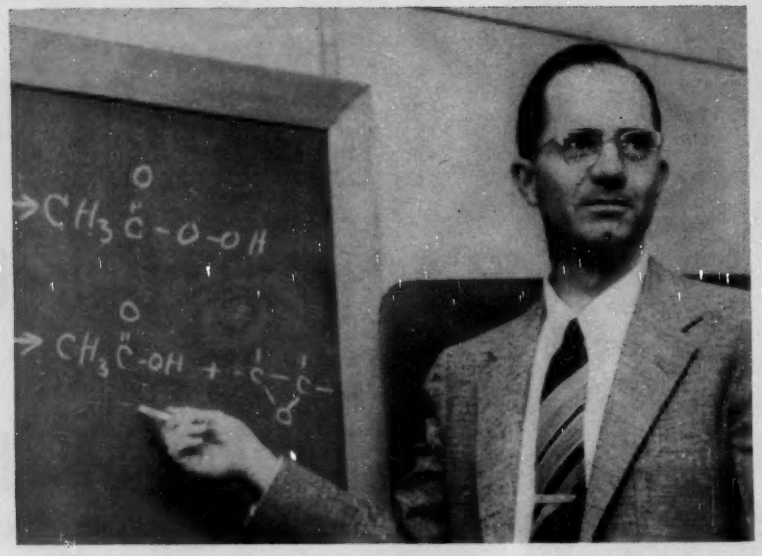


CARBIDE'S PHILLIPS: Control and separation were the secrets.

that poses shipping hazards, so Carbide will concentrate on making and selling peracetic acid derivatives. It will, however, sell a solution of peracetic in acetic acid. And it will do custom epoxidations for customers. Present plans suggest a commercial unit to produce between 25 and 50 million lbs. of derivatives a year.

Controlled Decomposition: The company is keeping its own counsel about details of the synthesis. It does say that it oxidizes acetaldehyde to form acetaldehyde monoperacetate (AMP). At room temperatures, AMP decomposes rapidly and exothermically into acetic acid. But at lower temperatures, it can be made to yield peracetic acid and acetaldehyde. Phillips and his group found out first how to control the decomposition, then how to separate the two products so they wouldn't react with each other.

A clue to the path of the first part of the reaction may be found in a British patent assigned to Carbide (735,974). It describes how acetaldehyde—preferably in a solvent—reacts with air or oxygen at temperatures below 15 C; AMP is the product. Salts of heavy metals (cobalt, copper, iron) catalyze the reaction—unfortunately, they also tend to decompose the AMP.

The same patent describes a method of using acetaldehyde monoperacylate (e.g., peracetate) to convert an ethylenic compound into the corresponding epoxy derivative.

Borrowed on Time: The beauty of the synthesis, says Carbide, is that charges for raw materials are practically nil. Here's why:

It starts off with acetaldehyde, which is converted into peracetic acid. The latter is used to place the epoxy linkage on an olefin. In so doing, it generates acetic acid. So it uses acetaldehyde and oxygen to get acetic acid and the epoxy derivative. But acetaldehyde and oxygen are normally the raw materials for its production of acetic acid. What Carbide is doing, in effect, is "borrowing" the acetaldehyde for a short period for the new process.

This gambit fits in fine with its avowed intention of making epoxy derivatives. But it may not work out so nicely for a buyer of the acetic acid solution of peracetic who is not interested in making acetic acid. It could, in fact, create a marketing problem for such a firm. Carbide admits that, but points out that any buyer near a rayon plant would have no trouble selling acetic acid. Moreover, it's not inconceivable that Carbide or another chemical company would buy this acetic acid.

Many Tried: The appeal of an air oxidation to make peracetic from acetaldehyde isn't limited to Carbide, by a long shot. Findlay, Swern and Scanlon of the U.S. Dept. of Agriculture laid the groundwork for commercial epoxidations in this country when they showed (in 1945) that peracetic acid could be used to oxidize natural oils. One of their patents (U.S. 2,567,930) dealt with the oxidation of olefins to form epoxy compounds. In two examples, they blew air through an aldehyde, presumably to form the peracid. However, the olefin to be epoxidized was introduced into the reaction mass at the start, so theirs qualifies as an *in situ* synthesis.

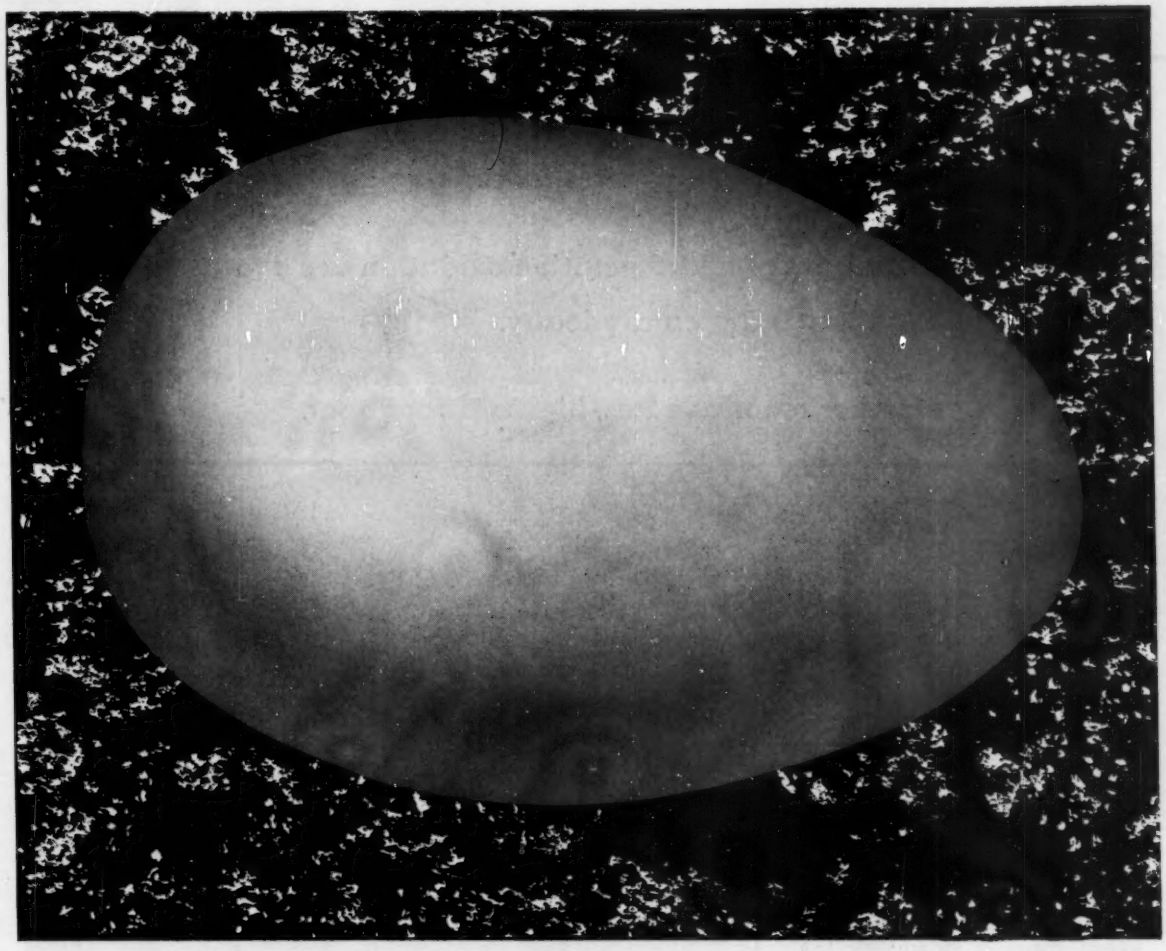
Work that probably more closely parallels Carbide's is that done by Joseph Bludworth for Celanese. He found (U.S. Pat. 2,314,385) how to prepare a peracid by preheating an aldehyde and then sending it through a reaction chamber. Benzene was added to the product to form an azeotrope with acetic, and the mixture was fractionated. In general, Bludworth's process was characterized by high temperatures (up to 450 F), high linear velocity of the gases (up to 60 ft./second) and short resident times (0.1 to 1 second). He managed to convert about 30% of the aldehyde into the peracid.

Route to Anywhere: Phillips freely credits the work done by USDA and by industrial concerns such as Becco, Du Pont and Rohm & Haas. But he feels that the product of his process is a more versatile epoxidation agent than anything now being used.

To prove it, he cites the earlier work of Nikolaus Prileschajew at Warsaw Polytechnic, who demonstrated how perbenzoic acid could be used to convert almost any olefin into the epoxy. The trouble with perbenzoic has been its high cost. Phillips says that his peracetic can be used interchangeably with perbenzoic. And Carbide will even sell the peracetic-acetic solution at a price competitive with anything on the market.

Both Du Pont and Becco have been pushing epoxidation reactions as an outlet for their hydrogen peroxide. Mostly, they've been emphasizing *in situ* reactions. The idea is to form two phases and to keep the epoxy product from coming into contact with products in the starting solution that would catalyze the degradation of the epoxy bond.

Both Du Pont and Becco are noncommittal about the Carbide development. The synthesis cannot be fully assessed until more is known about the efficiency of the system. But there's little doubt that, with the collective energy of all three companies behind it, epoxidation can't help but move forward.



WE LAID AN EGG

Did we fib? Yes, we did in a recent advertisement that featured our new multiwall tuber.

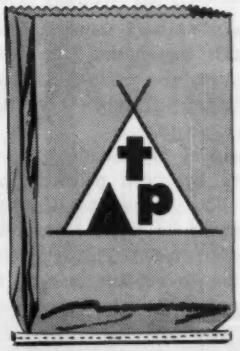
Here's the story. Our engineers worked with those of one of the nation's foremost paper products machinery manufacturers in an effort to develop the finest tuber possible. When it was finished and installed in our Akron plant, we were pretty happy, and, I guess, a little over enthusiastic. We inadvertently said it would outperform anything in the industry, and the next thing we knew, this statement popped up in our advertising.

Now, in all of our advertising, we have been careful to report only what we know to be the truth and, although we feel our new tuber to be an excellent piece of equipment, we are not so sure it will outperform all machines of its kind in the industry. So, we feel this notice necessary to keep our reputation for the truth intact.

Excellent equipment is important in the manufacture of a quality product, but Thomas Phillips is well aware that there are still other important factors involved. Thus the reason for the very special attention given to *all* phases of this operation to insure you the best in quality and service.

We'd like to show you a few samples of our work in the Small Bag and Multiwall fields. A letter will bring these samples to you, together with our latest brochure.

9939



THE THOMAS PHILLIPS CO.
AKRON, OHIO

PROBLEM: To keep tetrahydroanthraquinone from building up during the autoxidation process for making hydrogen peroxide.

SOLUTION: Interrupt the hydrogenation-oxidation cycle to dehydrogenate, catalytically.

RESULT: Quicker reaction rates, higher throughput.

Behind the New Peroxide-Process Twist

Allied has just received a patent (U.S. 2,739,042) on its nonelectrolytic process for making hydrogen peroxide.

The plant using the process has been in operation since early this year (*CW Technology Newsletter, Jan. 14*). But right from the start, Allied has refused to say much about its process. And even the recent patent doesn't tell the whole story.

It describes, for instance, a two-solvent system of an aromatic (e.g., benzene, toluene or xylene) and a 5-12-carbon alcohol (e.g., amyl alcohol or cyclohexanol). You'd never get the firm to admit it, but most likely, it's using two solvents not specifically mentioned in the patent: acetophenone and capryl alcohol.

Preserving the Nucleus: In any case, Allied's contribution to the processing of peroxide from the chemical (rather than electrochemical) standpoint consists of a dehydrogenation (*see above*) that interrupts the cycle but speeds reaction rates, thereby permitting higher throughput.

The classical autoxidation process for making hydrogen peroxide goes like this: First a quinone derivative (anthraquinone or alkyl anthraquinone) is hydrogenated. This is a selective reaction to replace one of the oxygen atoms with a hydrogen atom and a hydroxyl group. The hydroquinone that results is sent through an oxidation with oxygen (or air) to split off hydrogen peroxide and to regenerate the anthraquinone.

The product is then sent through a countercurrent water wash to remove the peroxide. The quinone is sent back for recycle.

The trouble with this, as Allied sees it, is in the hydrogenation step. For, in addition to forming the desired hydroquinone, the hydrogen attacks the aromatic nucleus to form some tetrahydroanthraquinone. Being more stable than the hydroquinone, the latter oxidizes with difficulty, builds up in the process and appreciably slows the reaction.

Studies by Allied have shown that ethylhydroquinone undergoes hydrogenation two or three times faster than the tetrahydro derivative; oxidation goes three or four times faster.

The conversion into hydrogen peroxide per pass is low, on the order of 1% of the working solution (of 10% quinone and 90% solvent). So it's necessary to recycle the working solution at least 1,000 times for a commercial operation. Even a small amount of the tetrahydro formed on each pass, therefore, becomes significant.

The solution worked out by Allied is simply to insert an extra dehydrogenation step in the cycle, After the peroxide has been removed, the working solution containing the tetrahydroquinone is passed through a dehydrogenator where it's heated in the presence of a catalyst such as nickel or palladium. The latter is preferred because it has high reactivity. And since it need not be separated, it can actually be used as a hydrogenation catalyst in the presence of a high concentration of hydrogen later on in the cycle.

It isn't practical to reduce all the tetrahydro that's formed. Allied experiments indicated that keeping it within limits of 5-10% by weight of the total working solution would do the job.

In addition to permitting the process to go forward faster, the reduction of the tetrahydro permits larger throughput for another reason: it allows more strenuous hydrogenation techniques, which normally can't be applied because they favor hydrogenation of the aromatic nucleus. Thus Allied's hydrogenation step, which seems to interrupt the cycle, actually shrinks it two ways.

Job for Strong Acid?

The Army may soon be asking the process industry to find gainful employment for hydrochloric acid produced as by-product in war-gas manufacturing plants.

If so, it will not be a new problem for the chemical industry. It's not that by-product hydrochloric doesn't have an impressive list of qualifications or that it isn't a willing worker. It's simply a question of process economics.

Hydrochloric acid can be used for its acid value. Or, it can be used as a source of chlorine. In some respects, it's particularly desirable for the latter

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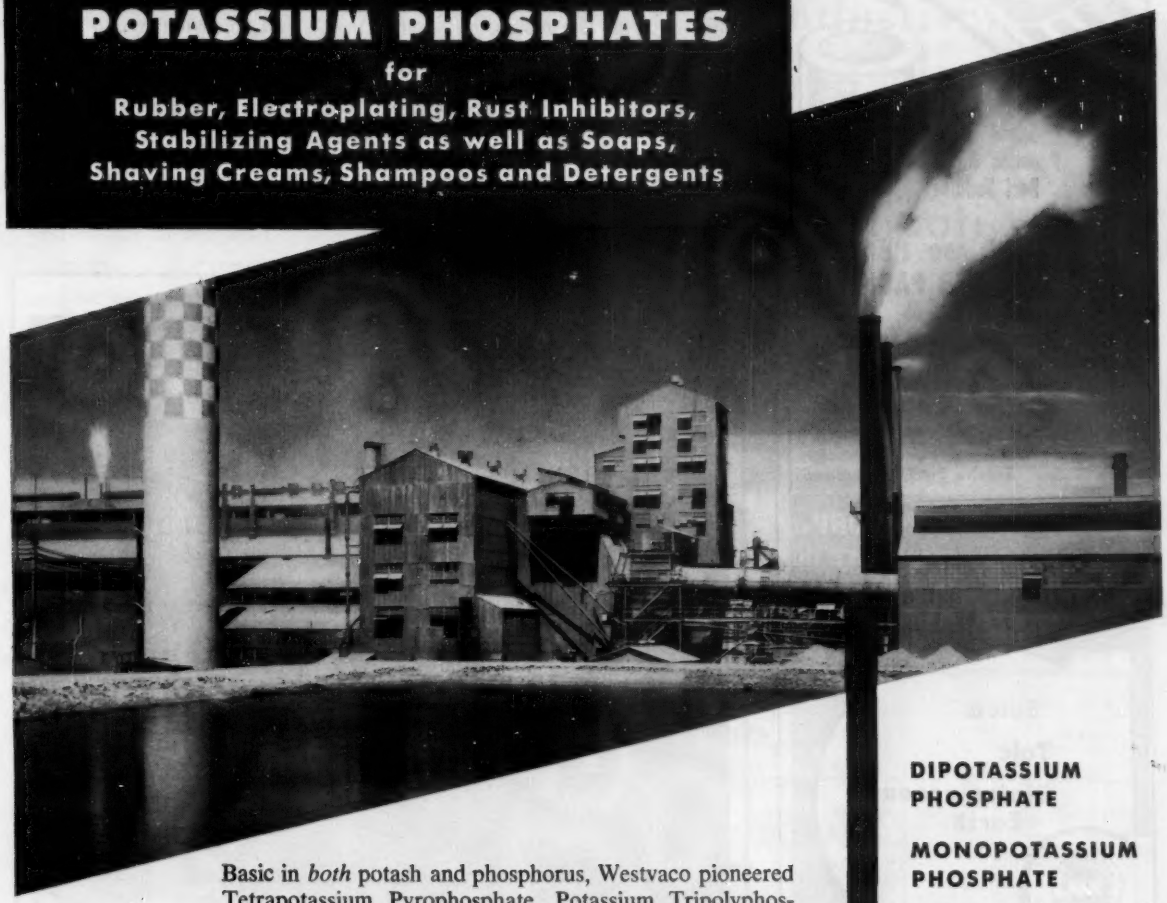

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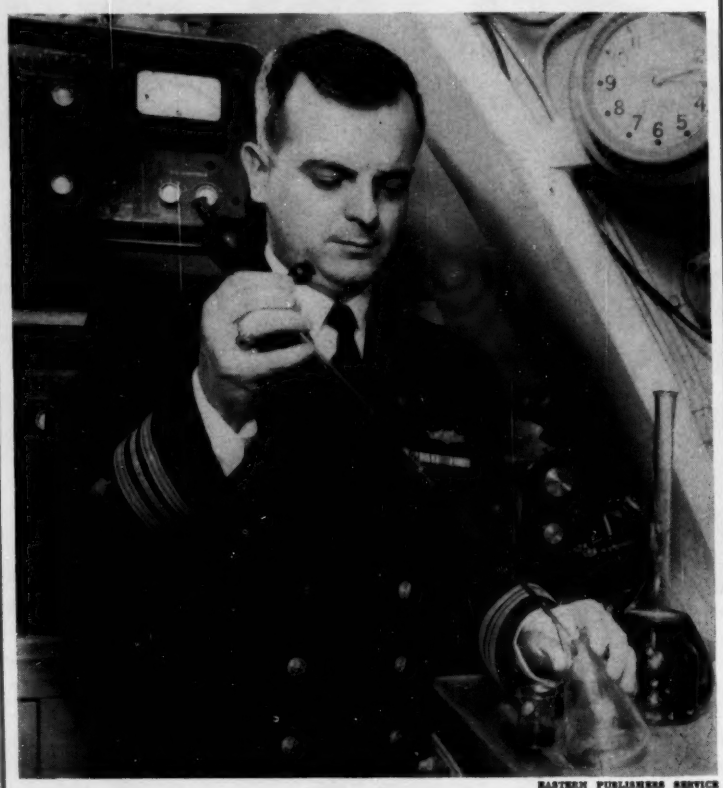
because it doesn't pose the problem of making (and marketing) a co-product like caustic soda. But chlorine can be made so economically that it doesn't pay to process the hydrochloric if you're near another source.

One Up, Two Down: Right now, only one of the Chemical Corps' war-gas plants—at Denver's Rocky Mountain arsenal—is operating. And it sells its by-product acid to the Atomic Energy Commission. But the Army's chemical chief, Gen. William M. Creasy, is worried about all the acid that would pour forth should it become necessary to reactivate the two idle plants—in Arkansas and Maryland.

Ideally, the Army would find markets for the acid in its own operations. Its policy is to avoid interfering with normal commercial outlets. In the past when it ran into a problem like this, it would turn to industry for help. But the transactions have always been on an informal basis.

Now, the Chemical Corps hopes to uncover solutions of its long-range problems by means of a more formal liaison program. To that end, the



EASTERN PUBLISHERS SERVICE

Sea-Going Isotope Separator

SIRED BY ATOMIC POWER, radiation hazards have, in turn, spawned several nuclear inventions. Among the most important are those developed for the protection of nuclear power plant personnel. Aboard the atom-powered *USS Nautilus*, medical officer, Lt. Comdr. John Ebersole (*above*), checks source of radiation by a simple radioisotope separation method developed specifically for radiation hygiene purposes. Trained in radiation medicine at Duke University and Oak Ridge, Dr. Ebersole formulated Navy's first radiation hygiene plan for a nuclear-powered vessel.

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TYPICAL ANALYSES OF MICHIGAN MAGNESIA COMPOUNDS

	No. 1 Calcined Magnesite	No. 5 Calcined Magnesite	No. 15 Calcined Magnesite	No. 30C Light Calcined Magnesia	No. 40 Extra Lt. Calcined Magnesia	Basic Magnesium Carbonate	(NF Grade) Magnesium Hydroxide	(Tech. Grade) Magnesium Hydroxide
Bulk density, weight per cubic foot	60 lb.	28 lb.	24 lb.	8½ lb.	5 lb.	5.5 lb.	15 to 25 lb.	app. 20 lb.
Ignition loss:	0.5%	1.5%	2.5%	1.9%	3.0%	56.5%	PASSES N. F. IX SPECIFICATIONS	31.4%
Chloride (as CL):	0.08	0.1	0.2	0.25	0.25	0.1		
Analysis, ignited basis:						NOT IGNITED		NOT IGNITED
SiO_2	0.3	0.3	0.3	0.3	0.3	0.15		0.20
Fe_2O_3	0.2	0.2	0.2	0.2	0.2	0.08		0.15
Al_2O_3	0.2	0.2	0.2	0.2	0.2	0.08		0.15
CaO	1.0	1.0	1.0	1.0	1.0	0.7		0.7
Mn				0.01	0.01	0.00		
Free Moisture						1.5		2.0
Screen test: Through 200 mesh		95%		99.9%	99.9%	99.99%	99.0%	99.0%
Screen test: Through 325 mesh			99.5%	99.5%	99.5%	99.5%		

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PRODUCTION . . . . .

Army has recently set up a 34-member industry council to assist in solving some of the Chemical Corps' problems in manufacturing, procurement, management and engineering.

The by-product hydrochloric problem is likely to lead off a full work program now being drawn up by the Corps for the industry group. Officials feel they'll be able to name task groups and hand out assignments in six months.

The council will operate under Brig. Gen. Marshall Stubbs, who heads the Chemical Corps' materiel command. Vice-chairman and executive officer of the council is Leo F. Walsh, industrial adviser to General Creasy. The council's members are executives from firms in the chemical and allied fields.

EQUIPMENT . . . .

Smoke Control: Whether you monitor smoke to measure air pollution or combustion efficiency, you'll be able to do it more accurately, says Mine Safety Appliances Co. (Pittsburgh, Pa.), with a Smokescope. The new instrument, developed by MSA, permits observer to view smoke through apertures that reduce background distractions, provide direct comparison of smoke density with reference film discs. Accuracy of the Smokescope is said to compare favorably with standard Ringelmann Chart measurements under any condition of smoke density, light, and background.

•

Slurry Pump: Proportioneers, Inc. (Providence, R.I.) offers a new Flush-Feeder system for handling of high-concentration slurries and corrosive liquids. The unit features a novel check valve assembly that flushes the valve seat clean at every stroke of the pump. It's designed to prevent slurry from entering the primary displacement cylinder. Duplex action of the diaphragm provides a positive slurry flow down to 0.71 gph.

•

Cooling Towers: Acme Industries, Inc. (Jackson, Mich.) is out with a new line of Flow-Mizer cooling towers in capacities ranging from 15 to 100 tons. Special feature of the line, says Acme, is the newly designed Acme-Pak —a series of vertically mounted steel plates that provides fast heat dissipation, minimizes sedimentation and scale buildup.

CERIUM OXIDE

—a rare earth that sparked a revolution in a long established art in the glass industry

a report by LINDSAY

SOME twenty years ago in Switzerland, two technicians discovered the amazing glass polishing properties of Cerium Oxide. Soon it was being used extensively for polishing of precision lenses in Europe.

Then came World War II. Scientists in the optical industries in this country heard about Cerium Oxide . . . how it could polish faster and cleaner than any other known material. They thought that maybe this was the answer to the problem of accelerated production of precision optical pieces for our war machine. In a cloak and dagger operation, samples of Cerium Oxide were smuggled out of Switzerland. Tests confirmed the rumors . . . Cerium Oxide was IT!

This was early in the 40's when Hitler held most of Europe and the Japanese were driving toward Australia. The urgency of our growing war effort was putting fantastic demands on the optical industry. Lenses for bombsights, range finders, periscopes and other military instruments were needed desperately. Production had to be increased manyfold with no sacrifice of split-hair accuracy.

Lindsay, the nation's largest processor of monazite (the chief source of rare earths), undertook in 1942 the challenging task of producing Cerium Oxide. Day after day, Lindsay technicians worked with patience and speed to solve the inevitable production problems and in a remarkably short time, Cerium Oxide was being refined with the properties that met the demanding standards of the optical and glass industries. At about the same time, Barnesite, a rare earth oxide for ultra-high precision work, was developed and a few years later Lindsay took over exclusive production.

By war's end, Cerium Oxide had virtually revolutionized glass polishing practices in this country. Today, it is widely used in the production of distortion-free TV tubes, fine quality mirrors and precision optical lenses.

Opticians like Lindsay's Cerium Oxide (sold under the trade name CEROX) because it enables them to polish lenses to prescription specifications faster and to give you glasses exactly as the doctor ordered.

Leading automobile manufacturers use Lindsay's Cerium Oxide to polish out windshield scratches just before shipment. One of the largest producers furnishes its dealers with kits containing Cerium Oxide to remove nicks and scratches picked up in transit.

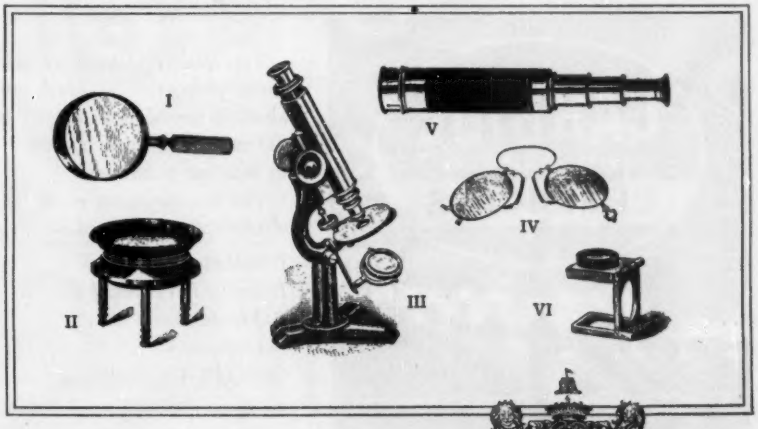
Why is Cerium Oxide such wonderful stuff when it comes to polishing? Frankly, nobody knows. Lindsay's technical people have tested and retested it, put it through countless laboratory analyses and peered at it for hours through high-powered microscopes. Just as scientists know how to *use* electricity, but don't know what it *is*, so too, they know that Cerium Oxide is a remarkably efficient polishing agent but *why* is still a mystery.

Like all the other rare earths, Cerium Oxide is a versatile material. Research disclosed its unique potentials (along with didymium, neodymium, and other rare earths) for use in coloring and decolorizing glass and it is extensively used for that purpose. Another interesting use is as a catalyst with some chemical materials.

Twenty-five years ago, most chemists had little knowledge or curiosity about the rare earths. Then the dramatic emergence of Cerium Oxide as an important factor in the optical industry excited interest in the full range of the 15 rare earth elements—atomic numbers 57 through 71.

There are technical people who think that some of the rare earths have greater possibilities of revolutionizing processes in their industries than Cerium Oxide has had for polishing practices. We are encouraged to think so, too. We are shipping rare earths regularly for use in the production of such diverse materials as steel, aluminum, glass, ceramics, textiles, ammunition and for a variety of applications in the electronic and atomic industries.

We can give you comprehensive data about the many rare earth and thorium salts available. Your technical staff may find it rewarding and profitable to take a long, thoughtful look at these unique materials, to examine their characteristics and, particularly, their potential applications to your own processes.



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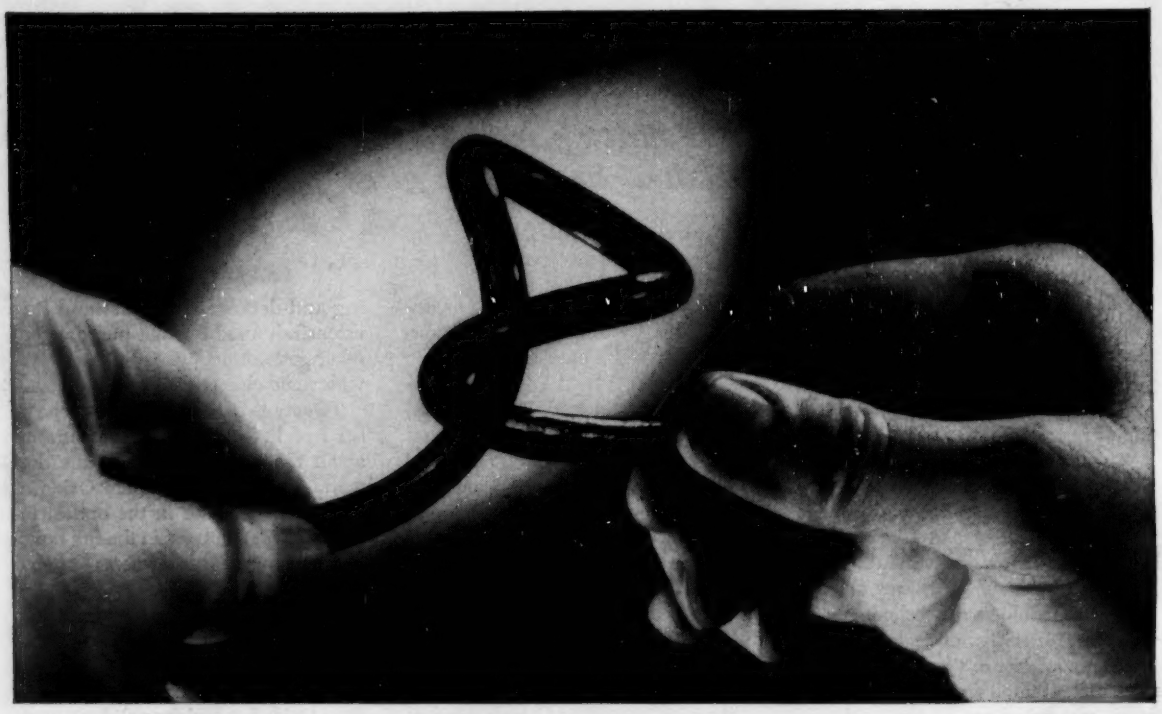

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Distillation, 760 mm.	*215 to 225°C.*
Primary Decyl Alcohols, min.	*98.0% by wt.*
Aldehydes, max.	*0.20% by wt. as decanal*
Acidity, max.	*0.002% by wt. as acetic acid*
Color (Pt.-Co. Scale)	*15*

For samples or further information on this new, high purity, low-volatile plasticizer intermediate, call or write the CARBIDE office nearest you. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal and Toronto.

CHEMICAL WEEK
April 14, 1956

Here's a preview of the rubber report President Eisenhower will submit to Congress later this month—provided, of course, that he approves the findings of an *ad hoc* interagency committee named by Defense Mobilization chief Arthur Flemming.

Gist of the study on long-term rubber resources and requirements: before another year is out, consuming industries will be free of dependence on imports, can look to a long-term future of ample domestic supplies. More specifically, the committee's major findings are:

• Producers of GR-S and other types of synthetic rubber expect to increase capacity from the present 1.25 million long tons/year to 1.7 million by the end of next year.

By comparison, domestic demand for all types of new rubber—both natural and synthetic—is not expected to reach the 1.7-million-tons level until 1960.

(The capacity estimate is based on reported planned expansions, a few of which are not yet firm. The 1.7-million-tons/year capacity breaks down into 1.44 million tons of GR-S and 260,000 tons of other synthetics; the figure for GR-S includes 170,000 tons of inexpensive oil extenders added to the mix at the GR-S plant.)

• Domestic users will keep using some imported natural rubber, for these reasons: (1) the government's stockpile rotation program will continue, (2) several big U.S. consuming firms operate natural rubber plantations abroad.

But the report notes that production of tree rubber is likely to remain static, contrasts this situation with the rapidly rising foreign demand for rubber. Only a handful of these countries can compete in home markets against U.S. synthetics, so the outlook here is for heavy exports of synthetics, and substantial imports of natural rubber.

• Natural rubber already in the government stockpile could see us through a five-year war. Moreover, three tire and two oil companies are conducting pilot-plant studies on newly developed synthetics that may be complete substitutes for natural rubber in heavy airplane, truck and bus tires.

• The report agrees with the National Science Foundation's proposal for more government-supported basic research on high-polymer synthetic elastomers. NFS's request for legislation to sell the government's rubber laboratories at Akron is also endorsed.

• Unqualified success—financial and otherwise—is claimed for the big disposal program that saw nearly all the war-built synthetic rubber plants sold to private industry; full recovery of the government's investment and operating losses, plus a $22-million profit is the specific claim.

•

Noncellulosic textile fibers continued to set the pace as man-made fiber usage rose to a new peak in '55. Preliminary estimates by the U.S. Dept. of Agriculture place last year's total domestic consumption of synthetic fibers at 1.85 billion lbs.—up 25% in one year, and well above the previous record of 1.5 billion lbs. set in '53.

Noncellulosics accounted for 432 million lbs. of the total, were up 104 million lbs. (30%) from '54's record high.

But rayon and acetate also had a good year as consumption climbed to a near 1.42 billion lbs., topped their 1950 record of 1.35 billion. Consumption in '54 was somewhat over 1.15 billion lbs.

All types of acetate, except filament yarn, shared in the increase; but the sharpest gains were recorded by high-tenacity rayon yarn, up 25% from '54, and by rayon staple fiber, which soared 36% above the previous year's demand.

What happened to cotton? Domestic mills chewed up almost 4.2 billion lbs. of raw cotton. This was 26.5 lbs./capita, compared with 25.4 lbs./capita in '54 (then 25% lower than a decade earlier).

•

Just about ready to go onstream is Columbia-Southern's new titanium tetrachloride plant at Natrium, W. Va. Partial production is scheduled to begin next month, full capacity operations shortly thereafter.

The tetrachloride will be used by Electro Metallurgical (division of Union Carbide) at Ashtabula, O., to make titanium sponge.

•

Active in both imported and domestic fluorspar (*CW Market Newsletter, March 31, '56;* and *CW, Nov. 19, '55, p. 119*) is Pennsalt; its subsidiary, Pennsalt International, has just imported an initial 4,400 tons of fluorspar from an affiliated Mexican company, Minerales y Metales Industriales.

This first shipment of metallurgical-grade spar will go to three Bethlehem Steel plants for use as a flux in production of open-hearth steel.

Pennsalt also holds large reserves of acid-grade spar in Livingston County, Kentucky, where new mining and expanded milling facilities are scheduled for completion late this month. Acid-grade material from this source will feed the company's fluorine chemical plant at Calvert City where it will go into the making of Isotrons—a new line of aerosol propellents and refrigerants.

•

Higher prices are in store for small-lot buyers of technical Moly-Sulfide, Climax Molybdenum's lubricant additive. The new per-pound schedule, f.o.b. Langeloth, Pa.: 200-400-lb. quantities, $1.26; 600-800 lbs., $1.18; 1,000-4,800 lbs., $1.12; and 5,000 lbs. and over, the base price of $1.08/lb.

The minimum order from Climax—formerly 50 lbs.—is now 200 lbs., though specialty lubricant manufacturers are able to handle and service smaller purchases.

•

Looking for dispersed colors for plastics? Onstream with doubled capacity is Claremont Pigment Dispersion (Roslyn Heights, L. I.), with increased output of colors for vinyl, polyester and epoxy plastics, as well as ink for the plastics industry. Also available is a new line of color granules for use in polyethylene.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending April 9, 1956

	Change	New Price
UP		
Calcium phosphate, dibasic, feed grade, 18½% P, bgs., c.l., frt. equald., ton	$ 5.55	$79.55
Magnesium silicofluoride, dms., wks.	0.005	0.105
Manganese dioxide, African, 84-87%, bgs., wks., ton	5.00	102.00
Thymol, fib. dms.	0.25	2.50
DOWN		
Casein, Argentine, grd., bgs., c.l., duty pd.	0.01	0.24

All prices per pound unless quantity is stated.

How Fulton's Ful-Flex Elastic Multiwall paper bags save money by replacing costly rigid containers—even when shifting and caking are problems.

BY: J. F. Ryan, *Manager*
Multiwall Department, Bag Division
Fulton Bag & Cotton Mills
St. Louis, Missouri

1. In storage and shipment of many chemicals, caking and shifting have led to the adoption of rigid containers which are costly. And the extra weight adds extra dollars to shipping costs.

2. Many firms have turned to Fulton's Ful-Flex® Elastic Multiwall Bags for a cost-cutting answer. These bags are light-weight, strong, and resistant to caking and shifting. Why? A closeup shows you.

3. Kraft paper is crinkled to provide firm support, giving only under unusual stresses — just enough to prevent breakage. The grip provided by this surface also prevents slipping in storage and shipping.

4. FREE! Special posters for use in plants feature easy-to-understand "Do's and Dont's" on the handling of multiwall bags. An exclusive free service to Fulton customers.

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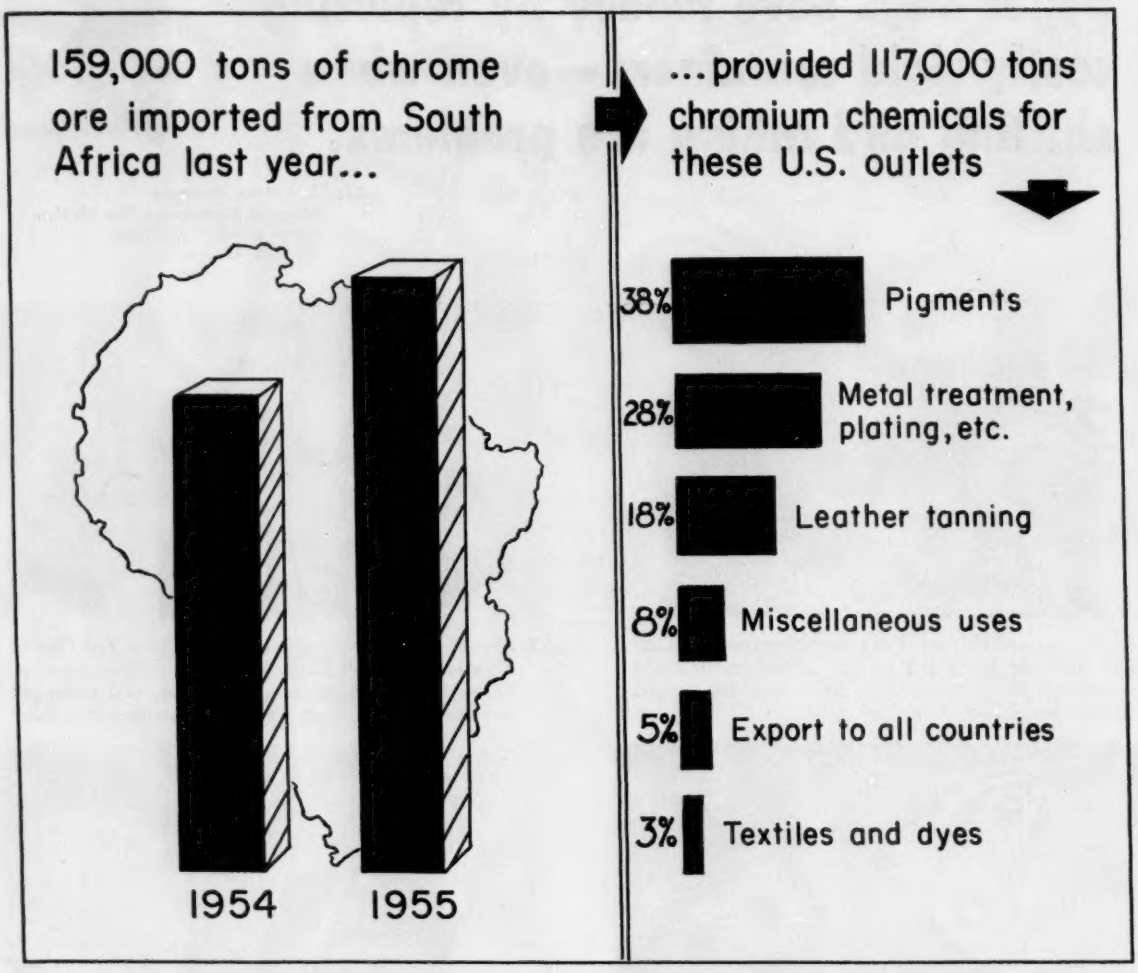
159,000 tons of chrome ore imported from South Africa last year...
1954
1955
...provided 117,000 tons chromium chemicals for these U.S. outlets
38% Pigments
28% Metal treatment, plating, etc.
18% Leather tanning
8% Miscellaneous uses
5% Export to all countries
3% Textiles and dyes

Chrome Pacesetter: Imports

An aura of prosperity envelops the nation's chromium industry, and with good reason: last year, chrome ore consumption in the U.S. soared to 1.58 million short tons—a startling 70% above the 1954 mark.

But despite every indication that use of chromium and chrome chemicals will continue at a high level, no one can quite forget that the industry's prosperity depends almost entirely on uninterrupted imports of chrome ore.

Consequently, it's cause for concern that South Africa—the source of all the chemical-grade chromite used in this country—may be planning to step up chrome chemical production in order to compete more vigorously in world markets.

Disturbing, too, is the fact that at least one other country (Yugoslavia) is already boosting its chrome chemical capacity, also intends to compete in foreign markets.

How will these developments affect the U.S. chromium business? Here's the way it looks now:

Import Fetters: In a sense, the U.S. can be—and is—classed as a "have not" nation with respect to chromium. Yet the country is not entirely devoid of workable chromite reserves; in fact, last year four states and Alaska produced a total of about 152,000 tons of ore—but the amount was small compared with the more than 1.8 million tons imported.

Meanwhile, total U.S. consumption of chromite in '55 was about 221,000 tons less than the import volume and 373,000 tons less than the total new supply.

The nation's industries, therefore, relied almost entirely on foreign sources for the vital ore. In 1955, this country imported close to 848,000 long tons of metallurgical-grade ore (345,000 from Turkey, 287,000 from Rhodesia, 104,000 from the Union of South Africa, and the rest from 10 other countries); foreign countries also provided 567,000 long tons of refractory-grade chromite (Philippines, 458,000; Cuba, 51,000; five other countries, smaller amounts).

But the status of chemical-grade

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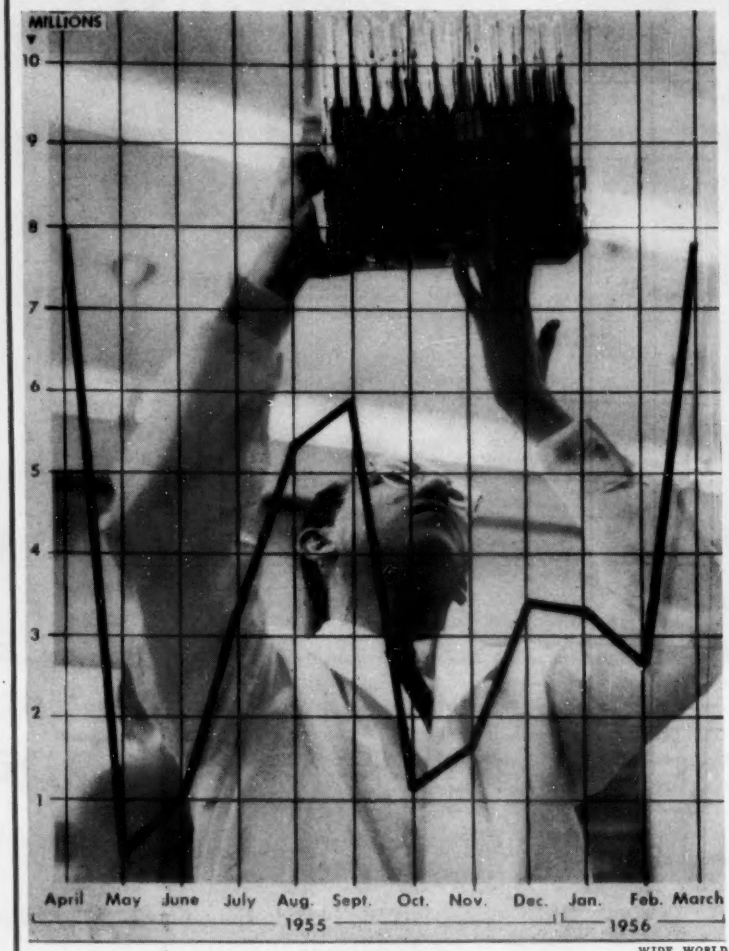
chromite was unique in that all U.S. needs—196,000 l.t., of which 159,000 s.t. were for chemicals (*chart, p. 106*) —were supplied by mines in South Africa; unlike other U.S. chromite users, the chemical industry must look to this one foreign country for a satisfactory grade of ore.

African Threat: Consequently, the possible development of a large chrome chemical industry in South Africa is of more than passing interest to producers in this country.

However, the Business & Defense Services Administration recently stated: "A few months ago, it appeared that South Africa, the source of bichromate imports as well as of chemical-grade chromite, would expand its chromium chemical production and thus become a more serious competitor in world markets. However, latest indications [from South African sources] are that the expan-



WIDE WORLD

Vaccine Zigzags

ERRATIC SUPPLIES marked the first year of Salk vaccine use. Close to 8 million cubic centimeters of vaccine were released last April; but following the discovery of live virus in some lots, output rose and fell nervously. By March of this year, however, supplies had risen to within 38,000 cc.'s of the original starting volume.

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sion may not materialize soon."

It's probable that these plans by the African chemical industry will eventually materialize. The real questions are: just when will South Africa cease being primarily a producer of ore and step into the chromium chemical business in a big way? and, concomitantly, what will such a development program mean to U.S. producers?

Transportation Muddle: One obvious question is whether the demands of an expanded chromium chemicals industry in South Africa would so tax the mining facilities as to create a shortage of material for export. Directly, there would be no fear of shortage; ore supplies are plentiful, mining facilities are adequate. Indirectly, however, trouble could arise because of the notoriously inadequate South African rail transportation.

Said one U.S. chrome expert, "The railroads down there can't handle the ore they have now; in fact, we would be happier in this country if we could get more of the ore right now."

A few months ago, sources in Africa reported that chrome producers in the colony of Selukwe had been experiencing an extremely bad year, were in the middle of a slump period in railway shipments of stockpiled chrome ore. Some new rail facilities were being added, but it was nonetheless implied that these improvements would only serve to alleviate the bad situation, not solve the whole problem.

If these transportation problems persist when South Africa ultimately goes into "big time" chrome chemical production, movement of ore to other countries could be seriously hampered.

Other Competition: More immediate is the competitive threat from Yugoslavia. In past years, that country has had to import some 800 tons of sodium bichromate and 80 tons of chromic acid each year. But a new plant now under construction—called Yugohrom—will have a capacity of 5,000 tons/year of bichromate, 1,900 tons/year of chromic acid, several hundred tons of ferroalloys—right now much more than the domestic needs of the country. Hence much of the new chrome chemical output is reportedly aimed at foreign markets.

It's moot whether or not Yugoslavia (and South Africa) will be able to sell chrome chemicals here, despite their lower production costs; other factors, such as shipping costs (viz., insurance rates on bichromate are higher than on the ore), could offset any cost advantages over U.S. producers. Experts in this country are guessing that outsiders won't be able to buck the competition here—but then they aren't dead sure about it.

However, there isn't much doubt that foreign manufacturers will be able to give U.S. chrome producers a run for their money in foreign markets, will probably succeed in cutting to a much smaller figure the exports from this country (now about 5% of U.S. total chrome chemical output).

Domestic Problems: Why does the U.S. chemical industry rely so heavily on foreign chrome ore supplies? The simple fact is that domestic producers can't compete economically with the foreign material. Too, U.S. ore is not suitable for direct application in the manufacture of chrome chemicals.

It would be possible, technically speaking, to use concentrates of domestic ores—it's been done experimentally—but as long as better grade material is available from Africa, the economics militate against use of domestic ore.

It's somewhat reassuring, however, that if chrome imports were to be cut off suddenly—as in the case of a national emergency—the U.S. could supply at least part of its needs from domestic reserves, at higher costs.

Inevitably, the question arises whether substitute materials can be found should a chrome pinch occur. Molybdenum is one material that could provide at least a partial solution, though it's impossible to say to what degree. For example, the steel industry could substitute molybdenum for chrome in some cases—but even such limited use would first require considerable development work.

In the chemical field, molybdenum has already made some inroads into chrome chemical markets, notably in the manufacture of molybdenum-orange pigment, which is now used extensively in place of chrome-orange. But for a great many uses, there just aren't any substitutes for chromium.

And as last year's surge in demand of chrome chemicals indicates (*see chart*), the U.S. chrome business will undoubtedly continue to prosper; nonetheless, how rapidly expansion will take place will more and more depend on the activities of foreign ore and chemical producers.

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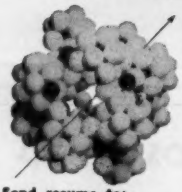

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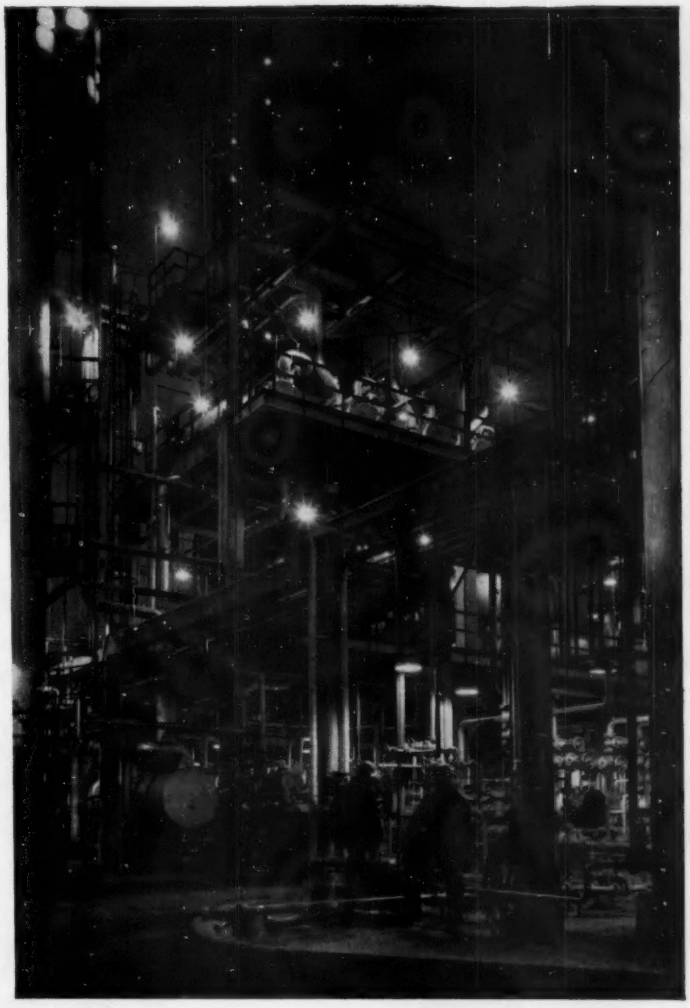

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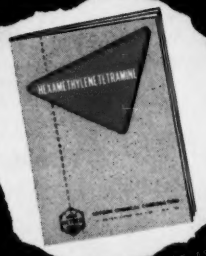
(Buffer in catalyst manufacture. Phenolic complex former)



The unique physical and chemical properties of Hexamethylenetetramine have resulted in extensive and varied applications in industry. This versatile intermediate can serve as a tertiary amine or, when desired, react like formaldehyde. Many of its newer applications depend on its ability to act as a weak base or buffer.

Do you have a new application or a current process in which Heyden "Hexa" can be of help? If so, feel free to call upon our technical service department for assistance in choosing the proper form and grade to meet your requirements.

For the complete story, ask your Heyden representative, or write direct, for a copy of the new Technical Bulletin HEXA 1-55.

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